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THE PATHOGENESIS OF *NEURO-LYMPHOMATOSIS GALLINARUM* AND SIMILAR FORMS OF "FOWL PARALYSIS"

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An increased number of field observations and laboratory necropsies on fowls, enable me to confirm and extend the conclusions previously published in the *Veterinary Record*, December 1931. Particularly it has been noted that a form of paralysis outwardly similar to that which is a striking feature of the disease known as *neuro-lymphomatosis gallinarum*, may develop in fowls as the outcome of different parasitic infestations. Moreover, the results of treatment with green food have now been observed over a period of nine months and the mortality occurring in the wake of different "fowl paralysis" outbreaks has been more closely investigated.

Since, according to the diagnosis, the preventive and curative methods applicable to these various morbid conditions must necessarily differ, it is important to ascertain the spread and extent of the several distinguishable forms of paralysis by all means at our disposal. Incidentally, it must be recognised that the heavy mortality through several avoidable causes is proving a very serious handicap to poultry farmers throughout Great Britain.

THE APPARENT SPREAD OF "FOWL PARALYSIS."

One may infer from the complex pathology of fowl paralysis, that even when neuro-lymphomatosis has been correctly recognised as the cause of death in some fowls on a farm, it does not necessarily follow that all other fowls dying soon after are affected by the same ailment; this also in the instances where the dying birds exhibited signs of terminal paralysis.

A rapid succession of deaths with similar clinical symptoms is usually due to the same cause and indicates the spread of a disease by contagion. Such an interpretation might be applicable to neuro-lymphomatosis, if it were easily communicated, like fowl-pox or fowl-plague. Instead, it is known by experiment that infectivity is low and capricious in the group of diseases to which neuro-lymphomatosis belongs.

The opinion of McGaughey (1931) can be once more confirmed; neuro-lymphomatosis in England is usually transmitted through the egg and therefore the disease is inherited in the sense that neuro-lymphomatosis is restricted to the progeny of some particular strain. Different forms of paralysis instead may attack any fowl irrespective of its ancestry, and then often as the result of parasitism.

The critical microscopy of the central and peripheral nervous systems of fowls dying in the course of what has been considered a "fowl-paralysis" outbreak, often reveals that, whilst quite different pathological conditions can outwardly produce similar, if not identical, symptoms of paralysis, yet the irregular, though diffuse, infiltration of the nerves by lymphoidal cells which is typical of genuine neuro-lymphomatosis only occurs in few. If the disease is considered to be diagnosable where such lesions are present, it appears as if only a relatively small proportion of the mortality on poultry farms is really directly due to neuro-lymphomatosis; whilst instead, at present, losses of, *e.g.*, 800 pullets out of a 1,000 are frequently ascribed to this disease.

The conclusion is that where mortality on a farm occurs in fowls of different strains or surpasses a proportion of 10-15 per cent. in any single strain, even if fowl paralysis has been diagnosed in some, contributory causes of death must be considered as being involved.

THE DISTINCTION OF DIFFERENT FORMS OF FOWL PARALYSIS

The outward appearance of fowls suffering from neuro-lymphomatosis has been already described in previous papers and an ever increasing number of observations has made it evident that considerable latitude exists in the symptoms of paralysis due to this and other causes. In each of several outbreaks the paralysis has exhibited more frequently certain symptoms differing from the common type; in birds from one farm flaccid paralysis of the neck was noticeable, whilst in those from others the neck was twisted and retracted. Paralysis of the legs might be flaccid or limp, with stretched out claws or again spastic with bunched claws. Infiltration of the iris was frequent in one or both eyes, so that the pupil became irregularly shaped or reduced to pin-head size. Lately, in one outbreak, paralysis of the gizzard was an outstanding and dangerous feature, so that four fowls died with their gizzard filled with lettuce.

Whilst it is true that fowls with symptoms of lymphoid infiltration of the iris and/or spastic paralysis of the legs are in all probability

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suffering from neuro-lymphomatosis, yet the disease may occur without these symptoms, so that microscopical analysis of the nerves is required to confirm the diagnosis. Moreover, it may be explained that in chronic coccidiosis and several other ailments, flaccid paralysis of the legs or wings occurs. The two conditions may be compared in Figs. 1 and 2.

Fig. 1.

Paresis and Leg Weakness through Chronic Coccidiosis (*E. acervulina*).

The pullets are undersized, the feathers dirty through crouching on the ground; claws stretched and limp; the birds can stand and walk, though with difficulty.

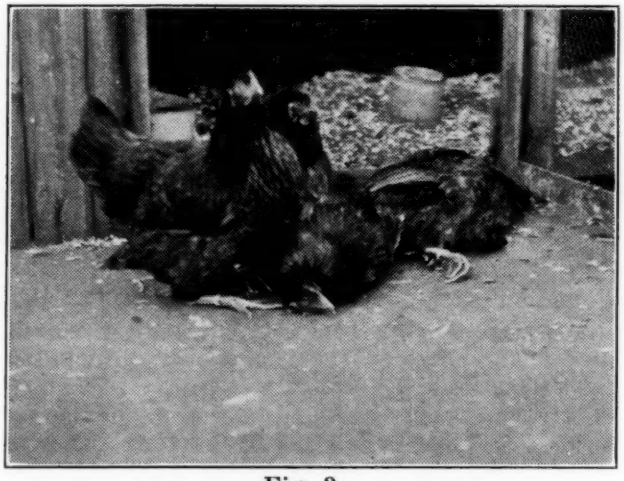

Fig. 2.

Complete Paralysis induced by Neuro-lymphomatosis.

Photograph taken February 22nd, 1932.

The bunched claws in some hens should be compared with the stretched, limp claws in Fig. 1. The fowls either cannot stand, or stumble if they try to walk.

An instant diagnosis is not always possible; to rely on outward appearances and even on the presence of thickened nerves after death is an uncertain procedure which indeed has frequently resulted in mistaken labelling.

Microscopical lesions occurring in fowls in different forms of paralysis are again illustrated (Figs. 5-8) to support the statement that the differential diagnosis resolves itself into a matter of critical microscopy.

LEG WEAKNESS AND SYMPTOMATIC PARESIS INDUCED BY FOWL COCCIDIA

The frequent correlation between fowl paralysis and intestinal parasitism has been mentioned and foremost among the infestations which may induce the appearance of symptomatic paresis in fowls, outwardly similar to the early stages of neuro-lymphomatosis, is to be reckoned coccidiosis, which should be distinguished as acute or chronic. The acute form is due to *Eimeria tenella* and attacks chicks at an early age and is soon noticeable through the appearance of blood in the droppings. Mortality is heavy, and most of the few surviving chicks remain stunted and undeveloped; a small proportion, about 10 to 15 per cent., may eventually gradually pick up and grow into fine birds, particularly if well fed; in other words, are simply retarded in development.

The acute form may merge into the chronic form, since the coccidial infection is frequently mixed and, in addition to other coccidia, may contain *Eimeria acervulina*. This coccidium persists and does not cause the acute lesions seen in infestation with *E. tenella*. On the other hand, it gradually injures the pullets and causes leg-weakness and paresis; this has induced some authorities to believe that it is a fertile cause of fowl paralysis.

This particular problem, whether coccidiosis is the cause of neuro-lymphomatosis, has already been considered by Pappenheimer (1929) who stated as the result of extensive and exact investigations that there was no significant correlation between the incidence of coccidia and neuro-lymphomatosis. Nevertheless, the view is still widely held that coccidiosis, past or present, can cause "fowl paralysis," so that the results of my own experiments may be here recorded as a contribution to the question.

PERSONAL EXPERIMENTS AND OBSERVATIONS

In September, 1931, a batch of 50 Rhode Island Red, four weeks old, healthy chicks, were temporarily placed by an assistant in a crate, which a month before, had contained for several hours a six-months-old undersized pullet, obtained from a farm on which an outbreak of neuro-lymphomatosis had occurred. The symp-

toms of this pullet during life were those of chronic coccidiosis and on death the cæca showed a chronic and mixed infection of *Eimeria tenella* and *E. acervulina.*

Within seven days blood-stained droppings were noticed in the cage of the 50 chicks and 5 of these appeared ill, with drooping wings, ruffled feathers; moreover, they tried to shelter in dark corners. These five chicks were killed; their cæcal pouches were swollen, dark red, filled with fluid and clotted blood. Microscopical examination of the contents confirmed the presence of coccidia and sections of the cæcal walls revealed, deep in the villi, oöcysts in different stages of development.

The cage was emptied, thoroughly creosoted, the sawdust changed daily, the drinking vessels and food-troughs sterilised by heat, but notwithstanding these precautions the disease spread and serious losses through death occurred in the chicks. To-day, March 31st, only nine pullets survive and of these six are below 2½ lb. in weight (instead of 4-4½ in controls) and the blood of these shows a peculiar microcytic anæmia which will be considered elsewhere.

It is worthy of note that in the course of this coccidiosis outbreak, the parasitic infestation spread to 25 other chicks (sex-linked wyandottes) which were kept in another part of the Institute. The transmission obviously occurred through the attendant who fed both groups of pullets. It may be explained that all these chicks were purchased as day-olds and were free from infection on arrival and four weeks afterwards.

It became very evident through the observation during life and after death of these 75 chicks, that acute and chronic coccidiosis does kill many chicks, leaves among the survivors many undersized and anæmic birds and retards the development of the remainder. Moreover, in many of the pullets the anæmia is connected with symptoms of leg-weakness or flaccid paresis; the birds are limp, crouch in corners or may even lie on their side; their underfeathers are soiled, their general appearance is very unprepossessing (Fig. 1). Still, all these symptoms during life and still more the signs obtainable after death, should be distinguishable from those occurring in neuro-lymphomatosis. The decisive diagnosis is microscopical, for the lesions which may occur in the peripheral nerves in coccidiosis are definitely inferior in intensity to those pathognomonic of neuro-lymphomatosis.

It is, of course, to be expected with the widespread distribution of chronic coccidiosis, that this disease and neuro-lymphomatosis may coincide, either on the same farm or even in the same fowls. Even so, it is important to distinguish the two conditions, for their treatment and prevention are totally different. Acute coccidiosis may cause heavy mortality by itself alone and chronic coccidiosis, in combination with neuro-lymphomatosis, is responsible for the heavy losses I have seen in some outbreaks.

DAVAINEA PROGLOTTINA AS A FREQUENT COMPLICATION IN NEURO-LYMPHOMATOSIS

In two outbreaks of heavy mortality among year-old pullets and which had been diagnosed as "fowl-paralysis" by competent observers, the cestode *Davainea proglottina* was found in very large numbers in the duodenum of all eight birds examined. The birds were obtained living and exhibited a flaccid paralysis of legs and wings which, however, was not as severe as that usual in neuro-lymphomatosis, for the fowls were able to stand for a short time. On necropsy the brain, sciatic nerves and inner organs were sectioned and microscopically examined. It was then seen that in the peripheral nerves definite infiltration with lymphoidal cells was present, without a noticeable swelling having resulted: the infiltration though slighter, was similar to that occurring in neuro-lymphomatosis (Fig. 5). This was by no means a constant lesion, for it was evident only in two fowls; the others showed even slighter degrees of infiltration; no perivascular cuffs in the brain were detected in any of these eight.

In all the cestode was present in large numbers in the duodenum, and had caused considerable naked-eye alterations, consisting in congestion and petechiæ of the peritoneal surface of the outer covering. Under the microscope a striking lymphoidal infiltration of the villi was present, together with minute hæmorrhages and round-celled infiltration of the subperitoneal lining and corresponding degenerative changes and infiltration of the pancreas.

The possible relationship between paralysis and *Davainea proglottina* has been discussed by Kotlan (1925) and also Niemann (1928); both as the result of observations on fowls in the United States. That neuro-lymphomatosis may develop without the presence of this or any other intestinal parasite is admitted; but in view of the lesions seen in these eight fowls, one may be justified in suggesting that *D. proglottina* may act as an inciting cause of paralysis; moreover, that where it complicates the occurrence of neuro-lymphomatosis, the course of the ailment is aggravated; this is the standpoint presented in my previous paper in this journal (December, 1931).

It may here be mentioned that feeding with lettuce in these eight fowls did not cause more than a transitory improvement; whilst the feeding of fowls from other sources and suffering from what was presumably uncomplicated or genuine neuro-lymphomatosis (Fig. 4) was followed by a relatively rapid improvement.

The presence of *D. proglottina* in fowls suffering from a peculiar type of anæmia (erythromye-

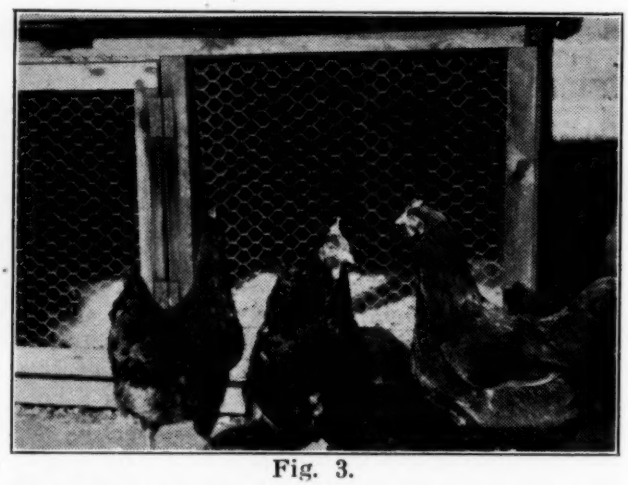

Fig. 3.

Three Rhode Island Red Fowls Completely Cured after Severe Acute Neuro-lymphomatosis.

These are the birds described in the *Veterinary Record* of September 5th, 1931. They have therefore survived since July, 1931, and are now laying.

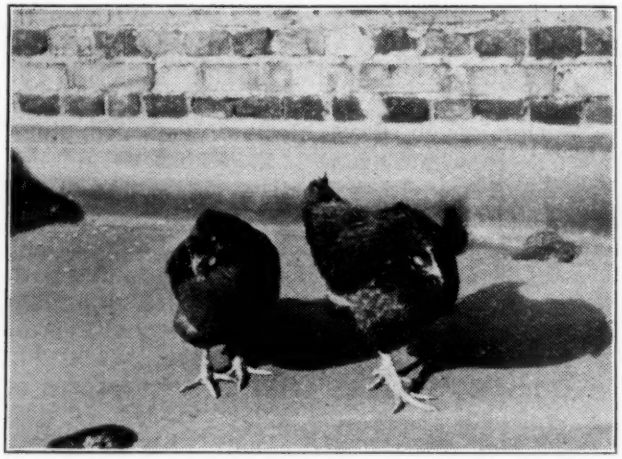

Fig. 4.

Two Rhode Island Hens Improving by Treatment, the same illustrated in Fig. 2.

These are now able to stand and walk, though slight wry-neck is still visible; since photographing on March 11th progress even more evident.

losis, Bayon, 1928) has been lately again observed. It can be confirmed that this cestode is not a harmless parasite, but instead, owing to its position in the duodenum and its usual occurrence in large numbers, it frequently favours the development of different morbid conditions in fowls.

LYMPHOIDAL TUMOURS AND NEURO-LYMPHOMATOSIS

The frequent simultaneous occurrence of tumours of the lymphoma type together with neuro-lymphomatosis has again become noticeable in the outbreaks under consideration. This observation has also been made by Pappenheimer (1929).

A very thorough paper on "so-called fowl-paralysis" has lately appeared by Warrack and Dalling (1932) with an accurate and complete review of the literature of the subject. In this paper the joint authors abandon the view they presented in 1931 that "fowl-paralysis" was due to coccidiosis, particularly as they have succeeded in transmitting the disease by inoculation. These authors found tumours of the ovary (unspecified) in 16 per cent. of the fowls with paralysis and in view of this frequent combination, suggest that the disease be simply called "lymphomatosis." This proposal does not commend itself from the standpoint of accurate pathological classification, because simple lymphomatosis occurs frequently in fowls, without any neural lesions and this condition has a distinct morbid anatomy. On the other hand, the nerve lesions in neuro-lymphomatosis provide the principal and diagnostic sign which enables the disease to be distinguished from lymphomatosis.

However, as long as the disease is correctly recognised the nomenclature can follow common usage. The experiments now reported are relevant to the question whether lymphoidal tumours are etiologically related to neuro-lymphomatosis or are a distinct morbid condition.

A LYMPHOMA CAUSING PARALYSIS BY BULK PRESSURE

The following necropsy notes describe the morbid lesions found in a year-old hen from a farm on which shortly before two other fowls of the same strain had died with tumours of the heart, unspecified by those performing the autopsy. On arrival, October 20th, 1931, both legs were found to be in a condition of flaccid paralysis and though feeding with lettuce was immediately begun, no definite improvement could be recognised, for the fowl died three days after.

Necropsy Notes..—Date: October 23rd, 1931. No. 224, Ref. C. E. W. Rhode Island Red hen; emaciated, comb red, skin pale, flesh pink. Lungs: pink, uniform. Liver: dark, firm, surface smooth, except for two pigeon-egg-sized, compact, sharply defined, round tumours; section of these white, soft; two similar pea-sized tumours are detected in the substance of the liver. Fresh specimens show these tumours to consist of round cells of the lymphoidal type. Spleen: small, round, pale; section uniform. Crop and gizzard: nothing remarkable. Intestines: duodenum and cæca contain numerous pellet- to pea-sized round tumours, either in the intestinal walls or protruding in the lumen, in which case their surface is eroded and bare. The mesentery con-

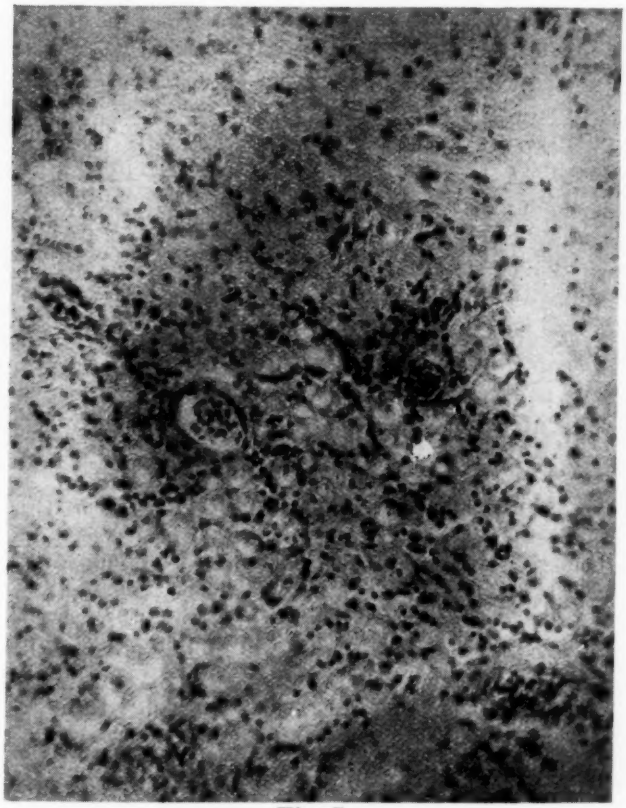

Fig. 5.

Section of sciatic nerve of hen with heavy duodenal infestation through *D. proglottina*. During life symptomatic paresis. The nerve shows dilated vessels and lymphoid infiltration.

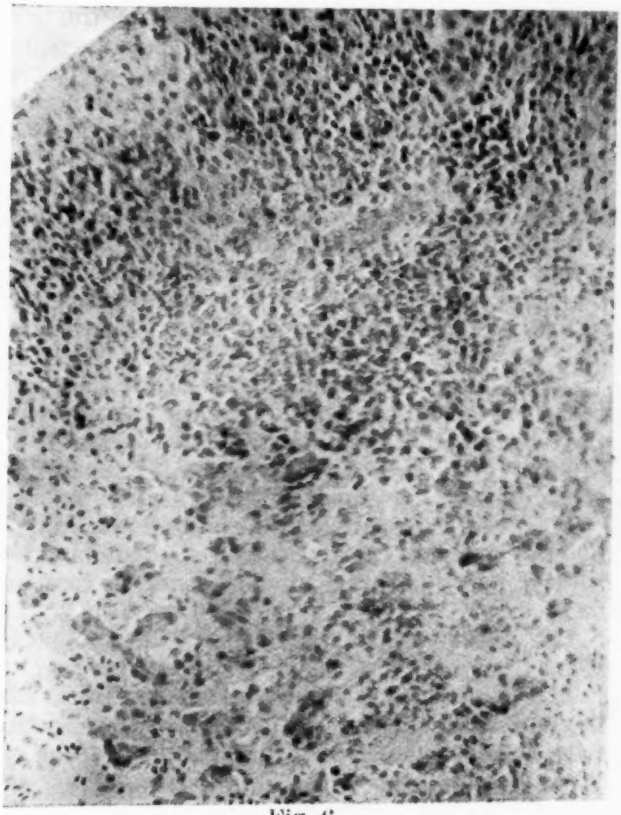

Fig. 6.

Liver of chick four months after inoculation in the pectoral region with lymphoma tissue. The liver is infiltrated by lymphoid cells and (top) the edges of a small lymphoma are discernible.

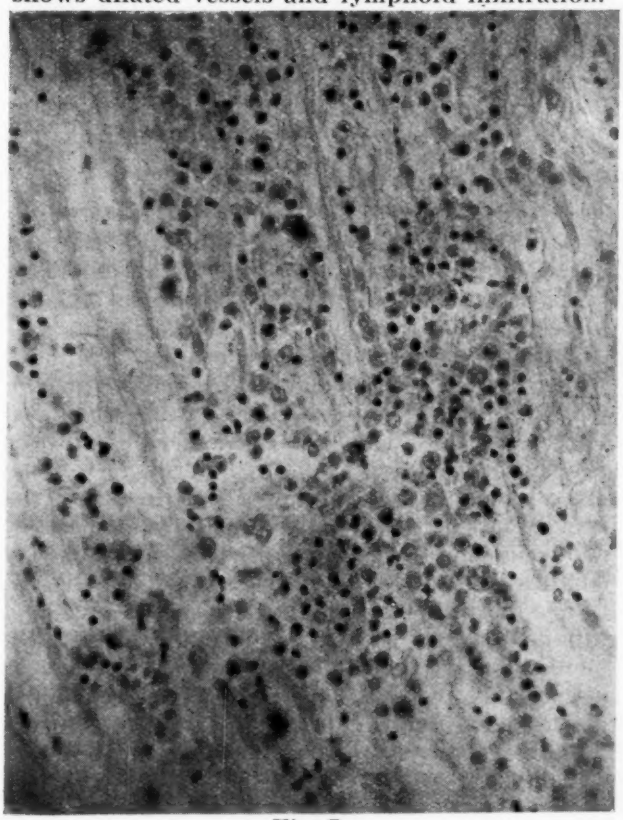

Fig. 7.

Lymphoid infiltration of sciatic nerve of hen with lympho-sarcoma of thigh. These lesions are more diffuse than those usually seen in neuro-lymphomatosis.

Fig. 8.

Section of sciatic nerve of cockerel which in July, 1931, had been cured of acute neuro-lymphomatosis. Died February, 1932. Fibrous scar tissue.

tains similar tumours, but the rest of the gut is practically free. No intestinal parasites detected. Kidneys dark, regular size. Ovary, quiescent. Oviduct small, but developed and contains in its lumen several minute pea-sized inspissated yolks. The lower end is involved by a large, horse-chestnut-shaped white tumour, similar in consistency and tissue to those described in the liver. This, owing to its size and tissue appearance is considered to be the primary growth; contains in its centre a layered, flattened, bean-shaped, yellow concretion, which may be yolk. The neoplasm is firmly adherent to the back of the abdominal cavity, and accordingly presses on the sciatic notch. The walls of the cloaca contain many small deposits of tumour cells. Bones: thin, easily cut; marrow: red, diffluent. Sciatic nerves: thin, white.

The paralysis observed during life is explained by the mechanical pressure exerted on the sciatic nerve by the intra-abdominal tumour masses.

The microscopical diagnosis of the neoplasm was: Lymphoma originating from the region of the bursa fabricii; metastasis in liver and intestinal tract. The sciatic nerves were found free from infiltration with lymphoidal cells.

The experimental transmission of a lymphoidal tumour.

On the same day as the necropsy, October 23rd, 1931, 25 Rhode Island Red six-week-old chicks were inoculated in the right pectoral region with 0·5 c.c. of this minced lymphoma. The inoculum was apparently quietly resorbed during the next three weeks, but during January five chicks died and on necropsy were found to have definite, minute, 2-3 mm. in diameter, tumour deposits in the liver (Fig. 6), heart, and in one instance also in the spleen. Two more died with discrete lesions in the liver. No symptoms of paralysis were noticed during life nor could lesions be detected in the nerves after death. The other surviving chicks have not shown any signs of accomplished transmission.

This example should indicate that under certain circumstances lymphomatosis can exist and be transmitted without the accompaniment of neural features. It will be noticed that no tumour developed at the site of inoculation, but that secondary deposits were found in the inner organs.

Lymphoidal tumours of the sciatic nerve.—It may be mentioned that in a Wyandotte hen, obtained (August 20th, 1931) from a strain in which neuro-lymphomatosis was present, a large egg-sized lymphoma developed in the region of the right thigh. This neoplasm involved the sciatic nerve and caused complete paralysis of the right leg. The microscopical appearances of the nerve are reproduced (Fig. 7).

TUMOURS OF A FIBROMATOUS TYPE INDUCING PARALYSIS

It can be stated that diverse pathological conditions may induce paralysis in fowls, which paralysis under circumstances may exhibit features very similar to those occurring in neuro-lymphomatosis. As an example, an outbreak of the disease among the pullets of a farm can be briefly mentioned. The morbid condition was diagnosed as "fowl-paralysis" by competent observers; nevertheless, the microscopical examination of the tumours seen at necropsy and the lesions of the inner organs and nerves showed them due to the proliferation of fusiform or spindle-cells of the connective tissue type. In genuine neuro-lymphomatosis the corresponding cells would belong to the lymphoidal series. The investigation of this outbreak has only begun and only three hens have been completely examined. In these the lesions can be classified as "neuro-fibromatosis," a morbid condition well known in human pathology, though in man it is not usually accompanied by symptoms of paralysis. It is not to be expected that these fibrous tumours should have induced the reported mortality in hundreds of pullets.

Moreover, where the paralysis is due to the proliferation of cells of the connective tissue type, the condition is distinguishable from neuro-lymphomatosis.

I have described in the *Proceedings of the Royal Society of Medicine*, 1922, a fibro-sarcoma originating from the sheath of the ulnar nerve in a hen, of a stock in which neuro-lymphomatosis was present. This tumour recurred after operation but did not cause metastasis.

PARALYSIS IN SOUTH AFRICAN OSTRICHES

This observation is introduced here not only because it calls attention to the existence of paralysis in other birds, but also since it indicates the benefit of green feed in birds.

William Robertson (1910) studied in South Africa a form of paralysis in ostriches, which from the symptoms described can be surmised to have been analogous to neuro-lymphomatosis. The birds exhibited complete paralysis of one or both legs and wings and in some instances the neck dropped; this notwithstanding the necropsy protocols contain no allusion to examination for cerebral, medullary or nerve lesions. It is mentioned that the duodenum seemed injected and inflamed and from its contents a coliform bacterium was obtained to which etiological significance was attached; accordingly 25 c.c. of this artificial culture were injected subcutaneously into an ostrich, which died within ten days.

These are the prophylactic measures suggested by Robertson (1910): "I always strongly

advise any farmer getting this disease on his farm to knock the affected birds on the head and shift the troop to clean bare veldt, hand-feeding with the cut green crop."

It is noticeable that among these preventive measures green food is recommended. I saw this ostrich disease on a farm in the Cape Province in 1912, after a period of prolonged drought, and the owner of the farm, Senator Southey, considered that the paralysis was due to the infestation by the nematode *Strongylus douglasi*, following on the lack of fresh lucerne in the feed. This opinion of a layman can be brought into agreement with experimental observations made by Ackert (1927) and which relate to poultry parasitism. These results will be discussed under the next heading, where the modern aspects of the nutrition of poultry will have to be considered, since the influence of vitamins on the development of fowl-paralysis appears to be definitely recognisable.

THE IMPORTANCE OF VITAMINS IN POULTRY NUTRITION

The value of different vitamins in the foodstuff of poultry may be considered in the light of the results already achieved by contemporary investigations in relation to the nutrition and health of man and animals.

It has been known since the time of Pliny that man cannot remain healthy without a certain minimum of "fresh" food. The practical inferences of this knowledge became very evident when long, trans-oceanic sea voyages were first undertaken and crews were stricken by "scurvy." One example among many—Sir James Lancaster, in 1601, noticed that his sailors escaped scurvy as long as he was able to give them three small spoonsful of lime-juice each day.

The why and wherefore of these and many similar observations has only been recognised during these last 20 years, so that knowledge of the subject of vitamins is still incomplete in many parts.

Both veterinarians and practical farmers are well aware of the importance of the quality of pasture in furthering the yield of high grade milk and moreover, fully recognise the necessity for wholesome greenstuff in the feeding of farm animals. More particularly in relation to poultry nutrition, it is known that withholding corn and greenstuff from laying hens results in pale egg-yolks; this is due to deficiencies in the pigments which accompany vitamin A. Accordingly, by feeding fowls on a diet lacking in vitamin A the quality of the eggs is eventually impoverished. It may be mentioned that a series of independent observations indicates that vitamin A exerts a beneficial effect in relation to several common bacterial infections; that a diet poor in this vitamin in expectant mothers may be followed by increased parturient mortality; moreover, the presence of vitamin A is conducive to regular growth and blood formation. Since eggs are a cheap and efficient source of vitamin A for the purposes of human dietary, the importance of not reducing their content of this valuable food factor is evident.

That is one aspect of the problem; but in relation to the hens themselves Emmett and Peacock (1923) and others also, observed that by withdrawing this vitamin from the diet of growing chicks, an inflammatory ophthalmic condition developed in 83 per cent.; this condition, or one similar (xerophthalmia), can be produced in rats by the same dietetic deficiency. Then Beach (1924) has shown the influence of the lack of this vitamin on the production in fowls of coryza and a peculiar proliferation of the epithelial respiratory membranes reminiscent of roup.

VITAMIN A AND HELMINTHIC PARASITISM IN FOWLS

Further, from another standpoint again, Ackert and his collaborators (1931) have tested the influence of different vitamins, more particularly in relation to intestinal parasitism and have found that a deficiency of vitamin A in the feed of pullets will cause them to be more easily infested with the common intestinal nematode, *Ascaridia lineata* (more usually known as *A. perspicillum*). Ackert (1931) mentions the significant observation that in 1927 he had examined 1,000 chickens on farms near Manhattan (Kansas) and discovered that 49 per cent. were infested with *A. lineata*. He further examined 500 chickens which he had reared in confinement and kept well supplied with vitamin A and, whilst all had been experimentally parasitised, yet only 28 per cent. showed infestation with this nematode. It thus appeared that the conditions on farms included something which lowered the resistance of the fowls to the helminths; the lack of green food in chicken yards during much of the year indicated that the deficiency in vitamin A might be one of those deleterious factors.

This and similar evidence can be quoted in favour of the importance of vitamin A in relation to the quality of eggs, and also as influencing the general health of hens by increasing their resistance to disease and parasitic infestation. The principal sources of this vitamin in intensive poultry feeding are green vegetables, cod-liver-oil and skim milk. Since this vitamin is resistant to heat and drying the beneficial effect of an addition of alfalfa to mashes is explained.

When fowls are on a free range, there is reason to believe that in addition to seeds, growing grass, larvæ and similar grubs may be a fruitful source of vitamin A.

THE VITAMIN B-COMPLEX

Next in alphabetical order is the so-called vitamin B-complex, whose most easily obtained source is baker's or brewer's yeast and wheat germ. Recent research has shown that this vitamin can be split up or separated into several fractions or components. One, distinguished as B_1, is that whose lack causes the development of experimental polyneuritis in fowls and pigeons; in rats its absence in food brings about restricted growth and atonic conditions of the intestines. In man it is known that rice deprived of its husk and silver skin, which contains vitamin B_1, results in outbreaks of beri-beri, a disease characterised by degeneration of the peripheral nerves and which was considered "to be always caused by acute duodenitis."

Vitamin B_1 is relatively thermo-labile, for it can be destroyed by prolonged steaming in an auto-clave, for example, three to five hours at 120° C. This fraction is present in egg-yolk.

The lack of the second fraction, known as B_2, is considered to be more particularly connected with the disease known as "pellagra" in man; in any case its absence in food will induce a form of dermatitis in experimental rats. This other fraction is heat-resisting, but can be separated from yeast by precipitation with lead acetate or concentrated on the surface of fuller's earth particles (elutration). It is present in egg-white.

Several other fractions have been differentiated in yeast, but the two mentioned are those which have been more widely tested; since they are present in eggs, it may be admitted that they play a part in the economy not only of the developing chick but of the adult fowl.

VITAMIN C AND GROWING CHICKS

Vitamin C is the so-called anti-scorbutic "factor" since its lack induces "scurvy" in man, a dangerous disease which can be rapidly cured by a few spoonsful of fresh vegetable juice. This dramatic effect I have seen in 1906 at the Seamen's Hospital, Greenwich. Vitamin C is present in growing green vegetables, and oranges and lemons and to a lesser extent in many other fruits and also vegetables. It is worthy of note that this important vitamin has been detected in wheat and other grains, a short time before they had begun to germinate, so that it appears it is not wholly produced or synthetised by the growing cotyledon or first leaf. This vitamin is more labile than the others, since it is destroyed by drying, heat sterilisation, or treatment with alkalies; hence its study is difficult.

It is stated that fowls do not require vitamin C and this is sometimes further extended by saying that birds can live and thrive without green food. Such opinions are based on experiments which show that, under laboratory conditions, hens can be kept for long periods, one year or 14 months, on food which does not contain appreciable quantities of anti-scorbutic factor. This anti-scorbutic factor is usually tested by a "scorbutic" diet on guinea-pigs, which as a result develop scurvy in a fortnight or three weeks. In the laboratory it does not seem possible to induce in fowls a disease resembling scurvy in guinea-pigs or man.

These experimental observations are admitted, but it has been noticed that the liver of fowls stores considerable quantities of the anti-scorbutic factor, which moreover is but relatively moderately diminished by prolonged feeding deficient in vitamin C. The liver and other organs of herbivorous animals are, one surmises, the source of vitamin C in rapacious birds.

Another point that should not be lost sight of, is that the requirements of adult birds and chicks in relation to this and all vitamins, may be totally different. Certain it is that it is considerably more difficult and it takes longer by withholding vitamin A to induce xerophthalmia in adult fowls than chicks; this is due to reserves in the tissues of the adult and also to its smaller requirements. Lately I have examined a chick and a pullet, both reared on intensive systems; on necropsy these birds exhibited punctiform petechiæ of the leg-joints, peritoneal lining and omental fat tissues. Such lesions can possibly be correlated with some scorbutic condition and will be further investigated.

LACK OF VITAMIN D AND "LEG WEAKNESS" IN CHICKS

Vitamin D.—This is well known and its importance in the regulation of the calcium and phosphates metabolism in growing chicks is generally admitted, since its lack causes rickets and distorted breast bones. Moreover, other obscure conditions of chicks and pullets may be due to its deficiency at an early stage; among these one may reckon a peculiar form of "leg-weakness" which has been confused with fowl-paralysis. The leg weakness due to lack of vitamin D occurs in two- or three-month-old chicks, whilst neuro-lymphomatosis appears in pullets five to eight months old; also the microscopical lesions are different in both conditions.

In intensive feeding, the source of vitamin D is cod-liver-oil; sunshine and fresh grass can substitute it in fowls on a free range. The effect of sunshine consists in activating the ergosterol normally present in the superficial layers of the skin, whence it is afterwards absorbed in the circulation. Vitamin D is present in egg-yolk, but the content varies at different seasons of the year, being lowest in wintry months.

Vitamin E.—This is known as the " genetic " vitamin, since its absence in food will experimentally induce sterility in rats. Its importance in relation to fertility in poultry has not been definitely ascertained [Card (1929)] but since it occurs in wheat germ and green vegetables, its action may be closely linked up with that of other vitamins as far as poultry is concerned.

. . . . .

This rapid and necessarily incomplete review of the knowledge lately obtained in relation to the part which vitamins fulfil in poultry nutrition, should simplify the complex pathogenesis of neuro-lymphomatosis. The results obtained in curing neuro-lymphomatosis by means of forcible feeding with lettuce, cannot be otherwise explained than by remembering that young lettuce contains varying quantities of vitamin A, B and C.

The observations made on farms where outbreaks of neuro-lymphomatosis had been severe seemed to indicate that a green food deficient in these three vitamins, such as rank grass or weeds, could induce the development of the signs of neuro-lymphomatosis. On the other hand, such deficiencies by themselves could not satisfactorily explain the pathology of the disease; the fowls affected belonged to one particular strain, whilst the others eating the identical food or even mixed with the diseased ones in the same pens, did not develop any visible symptoms. It seemed therefore that if one did not wish to find refuge in the facile explanation of " individual predisposition " a further causative element was required to complete the picture and that this must be " virus-like " in nature.

THE PATHOGENESIS OF NEURO-LYMPHOMATOSIS

Transmission experiments performed during these last years with avian diseases such as erythromyelosis, leucocythæmia and lymphocythæmia have persuaded me that unless one sets up an adequate number of controls together with each set of inoculations, uncertain or unreliable results are obtained; for it is possible to observe the development of these diseases in fowls as the outcome of several different damaging factors.

I have repeatedly experienced that by separating batches of pullets into two equal groups of 7-10 birds, inoculating one group and keeping the others as controls, the disease appears in two or three of the inoculated fowls and also, sooner or later, in one or two of the controls. If the disease were highly contagious or easily transmitted, like *e.g.*, coccidiosis, spread by contagion could be suggested; but easy infection is not at all evident in inoculation. My explanation instead is that the " virus " is present in a latent stage in many fowls, but requires an additional set of favourable conditions to multiply and induce recognisable lesions.

Against this the view has been adduced that the virus diseases of birds are all easily transmissible, in a 100 per cent. proportion. This is correct in relation to fowl-pox, fowl-plague and Rous-sarcoma N.1. In the artificial state they are usually obtainable as " strain-viruses " in the laboratory. But ease of transmission is unquestionably not the distinguishing feature of fowl-sarcomata of the Rous type encountered in farms nor, may it be added, of all " wild " strains of fowl-pox I have met. A discussion of this subject would carry too far; one must be content with the statement that avian proliferative " viruses " have been studied in fowls which have to be inoculated several times before they show a regular adaptation to their hosts in passage transmission.

If this is admitted, the experiments of Pappenheimer (1929) and those of Warrack and Dalling (1932) agree in showing that by inoculation of large numbers of chicks, neuro-lymphomatosis can be induced in about 20 to 25 per cent., whilst controls develop the disease in a proportion which may vary between 5 to 10 per cent. I may add that my own inoculations made with the intention of producing acute neuro-lymphomatosis in pullets have not yet succeeded.

Since, however, it is advisable to have some speculative basis on which to place a working hypothesis, I venture to suggest that neuro-lymphomatosis is the end-result of cumulative causes, among which one may place lack of palatable green food at an early age, which induces alterations in the vessels of the central and peripheral nervous systems. To this is added a proliferation of lymphoidal cells at a later stage, which cells congregate and localise particularly in the nerves, causing the paralysis symptoms; the discrete accumulations of lymphocytes in other organs do not exhibit obvious symptoms, as a rule. The exception is when the lymphocytes increase very rapidly and cause the development of lymphomatous tumours.

Some of the evidence required by these opinions is furnished by the results of treatment.

LASTING RESULTS OF TREATMENT

Since many different ailments in fowls may be accompanied by symptoms of paralysis, it logically follows that not all can be amenable to a single form of treatment and that a correct microscopical diagnosis is the first consideration in judging the results obtained. In my previous communications, an important link was missing in the chain of evidence relative to the curative results obtained by feeding lettuce to fowls with

neuro-lymphomatosis; for until they had been killed and examined, sure proof was lacking that they had been suffering from neuro-lymphomatosis. The advice of my American friends is that I should treat 100 fowls, cure them, keep 50 as controls and perform the microscopical examination of the organs of 50. The spirit is willing to organise research on such conclusive lines, but circumstances forbid.

Still, two hens and one cock have been killed once they had recovered; the hens had been under observation for one month, and the cock seven months. The inner organs and thickened sciatic nerves of the hens exhibited the usual accumulations of lymphoidal cells which are generally associated with neuro-lymphomatosis; after such a short period of time the regressive process was therefore mainly functional. On the other hand the cockerel, though it had been very active and even aggressive, showed that in the thickened nerves the lymphoidal cells had been replaced by cells of the connective tissue type; in other words, the lesions had healed with a scar (Fig. 8). Definite lymphomatous nodules were, however, present in the liver and kidney and there was a preponderance of lymphoidal elements in the marrow. My interpretation of these findings is that the feeding with lettuce brings about a functional cure of the nerve lesions but does not influence the proliferative action of the lymphoidal cells to the same extent.

The indications obtained from these three fowls should serve as a guide for further research.

It may be here confirmed that forcible feeding with fresh lettuce and, when not obtainable, with fresh water-cress, has cured 18 fowls out of 33 suffering from severe neuro-lymphomatosis. It is now possible to reproduce photographs of fowls before and during treatment, since some of the fowls illustrated are those which were sent to this Institute on July 16th, 1931, with their necks paralysed and beaks on the ground. If it is considered that now, after nine months, one of these hens is laying 2¼ oz. eggs every other day and the other two are 5 and 6 lb. in weight respectively, it must be admitted that the curative result has been complete in one instance and satisfactory in the other two.

PREVENTION AND TREATMENT IN PRACTICE

The examples I have quoted were cured by means which are not applicable on a large or commercial scale, since the forcible feeding with lettuce is expensive and laborious. Still it can be said that by mixing fresh green stuff with the mash and following out the simple preventive rules I have suggested in previous papers in this journal, neuro-lymphomatosis has been kept well within bounds in two farms at least. Once more it can be confirmed that the destructive policy of dealing with this disease by wholesale slaughter and radical disinfection is not justifiable, though appropriate in relation to highly contagious ailments of a somewhat similar nature.

This again indicates the necessity for accurate diagnosis; for the several examples I have described do show that many diseases and parasitic infestations may produce symptoms in fowls, which symptoms can easily be mistaken for those of neuro-lymphomatosis with waste of time, money and reputation for those concerned. Moreover, I can confirm that many of the fowls which did not react favourably to feeding with lettuce were either suffering from diseases differing from neuro-lymphomatosis or this disease was aggravated by other incurable conditions, which were not affected by the feeding.

Another point which requires emphasis is that neuro-lymphomatosis may occur in a stock of fowls which are perfectly kept from the standpoint of adequate green-stuff supply at an early age; in such instances the morbidity (that is the numbers showing symptoms of spastic paralysis) in pullets from five to eight months should not rise above 5 to 10 per cent. in the course of four months or so. If instead the mortality, that is death-rate, rises above 10 per cent. other pathological conditions are complicating the picture and a search must be made for additional causes of death.

The four simple precautionary measures I have already recommended are quite sufficient to control the further spread of this disease, which is particularly dangerous when not understood or is neglected. These four cardinal suggestions are:—

1.—Suitable feeding of young chicks.
2.—Accurate diagnosis of early cases.
3.—Judicious culling of all undersized birds.
4.—Careful scrutiny of breeding stock.

The hygienic measures to be taken in relation to different poultry parasites have been described in the *Veterinary Journal*, December, 1930, to which reference can be made.

SUMMARY AND CONCLUSIONS

1.—*Neuro-lymphomatosis gallinarum* occurs more frequently in the progeny of fowls of some definite strain, whose chicks in early life or during the growing period have not been fed with sufficient palatable green-food.

2.—That where following the recognition of neuro-lymphomatosis in some fowls, the mortality of the remainder rises superior to 10 per cent. of the stock liable to disease in four to six months, it is to be suspected that some complicating disease or parasitic infestation is present.

3.—Even where neuro-lymphomatosis has

developed in a strain, notwithstanding the presence of wholesome green-feed, then the mortality due to paralysis does not rise above 5 to 7 per cent.

4.—Neuro-lymphomatosis is not easily communicable and whilst frequently aggravated by the presence of different parasites, such as coccidia, cestodes, etc., yet can develop without their aid.

5.—Similarly, the lack of vitamin A and possibly also C, particularly at an early stage, influences the development of neuro-lymphomatosis, but cannot cause it.

6.—That treatment and prevention based on what has been learnt about the pathogenesis of neuro-lymphomatosis has enabled the disease both to be cured in some cases and prevented in others.

7.—That whilst the majority of the fowls which develop neuro-lymphomatosis are undersized for their age, and whilst the presence of spastic paralysis and an infiltrated iris must awaken suspicion as to the nature of the disease, yet the differential diagnosis between the various ailments which may simulate neuro-lymphomatosis requires specialised microscopical examination.

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The photographs of the fowls have been taken by Turners' Ltd., of Cambridge. I am obliged to Mr. Charles Harpley for the micro-photographs of the sections.

ROYAL SANITARY INSTITUTE CONGRESS

Many veterinary organisations have already appointed delegates to this "Public Health Parliament" which, at the invitation of the Corporation, will be held at Brighton from July 9th to 16th, 1932.

Lord Leconfield, Lord Lieutenant of Sussex and Chairman of the West Sussex County Council, will preside at the Congress.

The wide field covered is shown by the list of subjects which will be discussed, which includes the work of local authorities relative to cancer, the law relating to meat inspection, and the duties of a whole-time county veterinary inspector.

Professor C. E. A. Kinslow, Professor of Public Health at Yale University, will deliver the lecture to the Congress, and he will take as his subject "Current Tendencies in American Public Health."

This Congress is regarded as the most important public health gathering of the year, and a large attendance is already assured.

A large Health Exhibition has been arranged in connection with the Congress in the Dome and Corn Exchange.

The Worshipful the Mayor of Brighton is the Chairman of the Local General Committee; the Town Clerk and the Medical Officer of Health are acting as Honorary Local Secretaries, and the officers of the Veterinary Hygiene Section are as follows:—

President.—Alderman Sir William Phené Neal, Bt.

Recording Secretary.—Lieut.-Colonel J. A. Dixon, T.D., M.R.C.V.S., Chief Veterinary Officer, Leeds.

Local Secretaries.—W. Burt, F.R.C.V.S., Veterinary Inspector, Brighton; J. W. Pritchard, M.R.C.V.S., 255, Preston Road, Brighton.

Clinical Communications

TUBERCULOSIS OF THE LIVER IN AN AIREDALE

E. F. JARDINE, B.V.Sc.
Basseterre, St. Kitts

This dog, it was reported, was noticed to be not as lively as usual on Wednesday, March 2nd, this year, but my advice was not sought until Saturday afternoon, the 5th.

On that morning he was given a tablespoonful of castor oil, as his abdomen was very distended, but no-one could inform me if the oil had acted.

The breath was very offensive, pulse weak and fast, temperature 101° F., abdomen very large; the dog preferred to lie flat on the sternum, his appearance was dejected and there was a mucous discharge at the inner canthus of each eye.

The discharge from the eyes had been going on for a very long time and was always washed off with boric acid solution.

Diagnosis. — Enlargement of the liver with accompanying ascites.

Treatment.—℞ hydrargyri subchlor. grs. ii.
Sig.—To be given that night.
℞ Pot. iodi ʒi.
Aquæ ʒvi.
Sig.—One tablespoonful to be given t.i.d.

At 9 p.m. I was asked to visit the dog again as he seemed much worse.

Spts. ætheris nitrosi ʒi in water was given as a stimulant.

At 8 a.m. on the 6th I called to see the dog and he was found, after a search, among the ferns. Contrary to my instructions he was not tied up to see whether he had any movement of the bowels.

An exploratory puncture on the inferior surface of the abdomen near to the umbilicus was made, but only a few drops of serum escaped.

An enema of warm soapy water—about four pints—was given, but no fæces were ejected and only a very small quantity of the water was expelled. This was rather surprising.

All food was refused, even meat, and when a dog refuses meat—from my little experience with dogs—he is very sick.

At 1 p.m. I called again and the condition was about the same. On inquiring about the bowel movements no information could be given and I began to get a little disgusted with the indifference of the owners.

However, another enema was given and the water was retained.

The butler was asked to tell the owners that if the animal had no bowel movements by the following morning it would be advisable to perform a laparotomy and it might be found necessary to perform gastrotomy, resection of the intestines, etc.

The answer was: "Do what is necessary."

The attendants were told, after giving another dose of calomel grs. ii, to keep the animal tied up to observe if defæcation and urination occurred, as if the bowels acted there would be no necessity for an operation.

When I called on the Monday morning the dog was loose and no-one knew anything about the animal's movements. As I could get no information I left the case to call again on the Tuesday morning, if the patient were alive, and which I doubted. The dog died later in the day. At 4.30 p.m. a *post-mortem* was made. On opening the abdominal cavity the intestines and bladder were practically empty. The liver was increased to nearly twice its normal size and covered all over with tubercles; spleen, lungs and heart were normal.

No microscopical examination was made.

* * * * *

TETANUS IN A BULLOCK*

N. H. BROOKSBANK,
Royal Veterinary College

We were called out to examine this case in the evening.

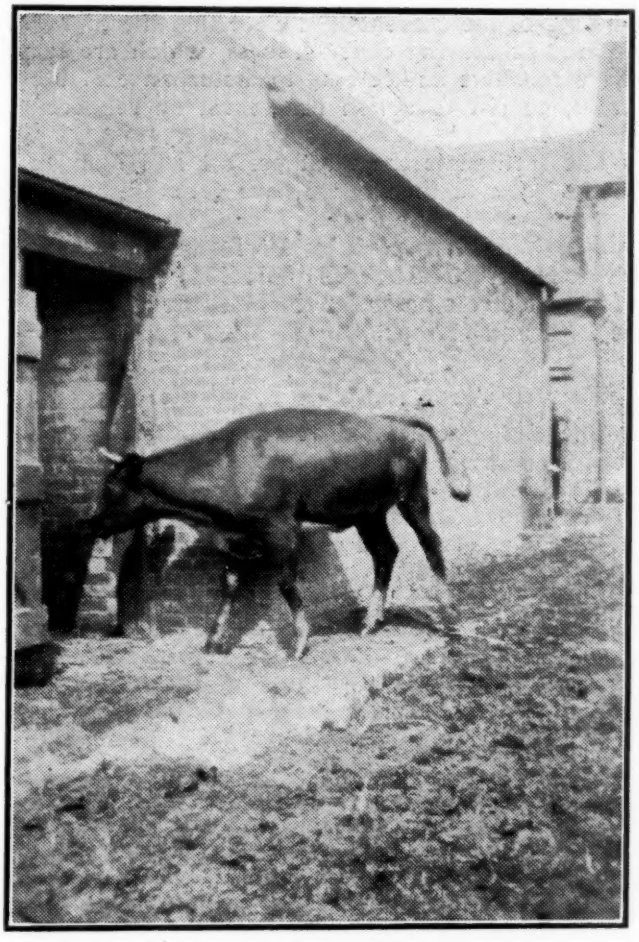
The owner stated that the bullock had appeared somewhat dull in the morning. In the evening it was very stiff in the forelegs and was unable to eat.

The animal had a stiff and wooden appearance. The jaws were firmly locked together and the creature was unable to eat or drink anything. The nostrils were dilated and from them slowly poured a catarrhal discharge. The eyes were prominent. The neck muscles were so stiff as to cause the head to stand forward, though not sufficiently to prevent its turning slowly from side to side. The animal made frequent attempts to regurgitate; the flank appeared flattened in a vertical direction, and the back was slightly arched. Respiration was normal.

The muscles of the forelegs were contracted, rendering the joints difficult to bend, although the animal was able to lie down. The legs were abducted whilst the bullock stood up. When it moved it jerked the forelegs forward, and on turning round pivoted about on its hind legs. When anyone made a sudden noise or unexpectedly swung an arm within its range of vision, the beast acted as if exceedingly startled, all the muscles of the body violently contracting in an effort to move away from the cause of alarm.

Thus the bullock exhibited all the signs of tetanus, uncommon though this trouble is in cattle.

*Case in series submitted for award under the N.V.M.A. Clinical Prize Scheme for Students, 1931.



The bullock was revisited the following day, but appeared to be in the same condition as on the previous evening. A bucket of water was placed before it, of which it tried to drink but could not. It had eaten nothing during the day.

On both visits the skin was examined very closely but no signs of any injury could be detected. As the animal was not improving and had eaten nothing for some time, it was killed.

(The photograph shows the bullock as it appeared on our second visit.)

The effect of the latest ruling in the dispute between Customs officers and consignees regarding a consignment of monkeys which recently arrived at Folkestone is that a monkey has four feet and no hands.

It was first held by the Customs officials that a monkey was quadrumanous—that it had four hands—and was therefore subject to the new import duties. The consignees contested this ruling, claiming that a monkey was a quadruped, and therefore exempt from duties. The Board of Customs has now placed monkeys in the quadruped class and freed them from duties. Since the dispute arose the Board has consulted a large number of authorities, including experts at the Zoological Gardens.

Reports

ELECTRICAL ANÆSTHESIA IN SLAUGHTER

Reports on the Use of the Electrolethaler No. 2 for Humane Slaughter of Pigs and Sheep*

W. L. SYMES, M.R.C.S.,
Professor of Physiology, Royal Veterinary College, London;

PROFESSOR SIR LEONARD HILL, M.B., LL.D., F.R.S., late Director Department of Applied Physiology, National Institute of Medical Research, and

FREDERICK T. G. HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E., Principal and Professor of Surgery, Royal Veterinary College, London.

Observations made at the factory of Messrs. Marsh and Baxter, Ltd., Brierley Hill, on March 12th, 1932.

1.—Individual Report by W. L. Symes, M.R.C.S., on the Effect of the Electrolethaler on Swine and Sheep

The apparatus used was one which enabled application of a pair of electrodes to the opposite sides of the animal's head with rapidity, ease and certainty.

The effect of establishing a pressure of 60-70 volts across these electrodes, was to produce immediate rigidity in the trunk and limbs, with complete loss of consciousness, and without evoking any sound, struggle or other sign of preliminary discomfort. On cessation of the current the animal lay completely relaxed and anæsthetic, without corneal or pupillary reflexes.

Unconsciousness was produced in swine, as above, for the purposes (1) of operation and (2) of slaughter, by application of the current for 10-40 seconds according to the size of the animal.

In the case of the operation, it was seen that two or more successive brief applications of current, at intervals of about one minute, maintained anæsthesia for 4-8 minutes; and that consciousness and muscular control were not regained until about two minutes after final cessation of the current. The animals then got up and within another minute or thereabouts were able to walk away without any sign either of present discomfort or recollection of any previous disagreeable experience.

In the case of slaughter, which is the main purpose of the apparatus, the animals were "stuck" within 15 to 20 seconds after cessation

*We are indebted to the Directors of Messrs. Marsh and Baxter, Ltd., Brierley Hill, for permission to publish these communications, which were made as private reports to the Directors of this firm.—Ed. *V.R.*

of the current, *i.e.*, long before consciousness would have returned.

Sheep were slaughtered even more expeditiously than swine. After a current lasting 10 seconds the "sticking" was completed and the neck broken within 5-10 seconds, again, long before consciousness would have returned. With the sheep, as with the swine, the application of the electrodes and current did not give rise to any apparent discomfort.

I regard the evidence yielded by the operations as conclusive proof that the use of the apparatus abolished consciousness without initial infliction of pain; and, that the duration of the resulting unconsciousness far exceeded the time necessary for killing the animals.

These considerations lead to the final conclusion that, from the humanitarian standpoint, employment of the electrolethaler provides a seemingly ideal preliminary to painless slaughter.

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2.—Individual Report by Professor Sir Leonard Hill, M.B., LL.D., F.R.S.

The experiments carried out at Brierley Hill on some 75 pigs showed that the application, to the head behind the ears, of the current by tong-like electrodes fitted with rake-like points at once produced loss of consciousness. An alternating current from 60 to 70 volts was used. The animals quietly fell over on to their sides. The breathing stopped, the pupils became widely dilated and insensitive to light, and the conjunctival reflex was lost. The moment the current was cut off the relaxation of the animal was complete, and it remained completely unconscious so long that the operation of castration could be performed—this was done in the case of two boars. The current was again applied in their case for a short period when breathing returned and there were signs of returning consciousness.

In killing pigs, after the application of the current for about 10 seconds the pig's leg was shackled so that it could be hoisted on a wheel and thus conveyed to the butcher, who stuck the pig in another 15 seconds or so, long before there was any sign of breathing, and while the pig was completely relaxed and unconscious; the bleeding was excellent—the blood coming out looking very dark and the colour of asphyxial blood. The instantaneous action of the current in causing the pig to fall over and the immediate stoppage of the action of the respiratory centre and the centre for eye movements, together with the complete relaxation and insensitiveness of the animals, shows that the electrical method produces immediate loss of consciousness. As asphyxia is produced by the stoppage of the action of the breathing centre, want of oxygen in the brain would maintain the loss of consciousness quite apart from the action of the current itself. As the eye centres and the respiratory are alike thrown out of action by the passage of the current it is clear that the higher centres subserving consciousness, which are far more sensitive and, owing to disturbance of the brain, go out of action first, must be rendered inactive.

The method is the most perfect and humane method of slaughtering we have yet seen.

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3.—Individual Report by Professor Frederick T. G. Hobday, F.R.C.V.S., F.R.S.E., on the Use of the Electrolethaler for the Humane Slaughter of Pigs and Sheep; also as an Anæsthetic for Operations

Report on the Pigs Killed for Food.

The pigs appeared to lose consciousness instantaneously as soon as the tongs were applied, the conjunctival reflex being abolished immediately.

From 10 to 15 seconds appeared to be sufficient length of time in ordinary eight score pigs, and 20-30 seconds for a large 20 score sow or boar, in order to produce an unconsciousness lasting for approximately two minutes; which was more than a sufficient length of time for the body to pass through the hands of the "sticker," where we saw no evidence that any one of the 75 animals felt any pain. The whole procedure was practically noiseless.

In no instance, either with the pigs or the sheep, did the animals show signs of fright or give evidence that they realised anything unusual was proceeding.

We are of opinion that this method of producing unconsciousness before cutting the throat is a most efficient one and that the animals upon which it is used do not feel the stab of the knife if this is effected within an approximate period of about two or three minutes after its application.

Report on the Sheep.

The tongs—the pegs of which have been specially lengthened in order to penetrate the wool—were applied to each sheep behind the ears for an average of ten seconds.

Unconsciousness was immediate and the throat was cut, and the neck broken, without evidence of any pain.

Use of this Method as an Anæsthetic for Operations.

Three large boars, each between three and four years old, and weighing about 28 score, were castrated under the anæsthetic influence of the apparatus. One animal was vicious, but in no instance was there any difficulty experienced in fixing the tongs into position.

In the first one the tongs were applied for one minute and the operation was commenced. A deep and definite anæsthetic effect lasted for two minutes, but as the operation (torsion) was not yet completed, owing to some old adhesions being discovered, and the pig was commencing to open its eyes, the current was re-applied twice for about 45 seconds each time until the operation

was completed. This took eight minutes altogether. This was evidently too much as the heart, after the third application, ceased to beat and, although artificial respiration was attempted, the animal could not be resuscitated.

In the other two instances the tongs were applied for 45 seconds on the first occasion and for about 30 seconds on the next. The operations took 7 and 4½ minutes respectively and in each case the pig got up two minutes later and quietly walked (unsteadily at first) back to another pen.

*Its use as an anæsthetic is not unattended with risk to the patient, as Mr. Anthony, M.R.C.V.S., the Chief Veterinary Official for Messrs. Marsh and Baxter, has observed, upon *post-mortem* examination of those killed for food, fractured bones in the carcasses as the result of the violent muscular spasm which takes place when the current is applied. The fact, too, that in one instance death occurred from too long an application of the current, is an illustration of the risk in this direction.

After the operation the pigs lay still for about two or three minutes, then looked around in a dazed manner and attempted unsteadily to get up. They were on their legs in about four minutes and walked unsteadily at first but in about eight or ten minutes were practically normal.

We have since been informed that the other two patients have made good recoveries.

March 12th, 1932.

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4.—Joint Report.

Report on the Pigs Killed for Food.

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From 10 to 15 seconds appeared to be sufficient length of time in ordinary eight score pigs, and 20-30 seconds for a large 20 score sow or boar, in order to produce an unconsciousness lasting for approximately two minutes; which was more than a sufficient length of time for the body to pass through the hands of the "sticker," where we saw no evidence that any one of the 75 animals felt any pain. The whole procedure was practically noiseless.

In no instance, either with the pigs or the sheep, did the animals show signs of fright or give evidence that they realised anything unusual was proceeding.

We are of opinion that this method of producing unconsciousness before cutting the throat is a most efficient one and that the animals upon which it is used do not feel the stab of the knife if this is effected within an approximate period of about two or three minutes after its application.

Report on the Sheep.

The tongs—the pegs of which have been specially lengthened in order to penetrate the wool—were applied to each sheep behind the ears for an average of ten seconds.

Unconsciousness was immediate and the throat was cut, and the neck broken, without evidence of any pain.

*Mr. Anthony draws our attention to the fact that, as mentioned in his article in the *Veterinary Record* of April 2nd, these cases of bone fractures, although amounting to only a fraction of one per cent., yet constitute a serious obstacle to the use of the Electrolethaler for the production of anæsthesia for surgical purposes.

Both boars operated upon made complete recoveries. One has since been slaughtered and a *post-mortem* examination revealed no bone fractures or other injuries due to the Electrolethaler. The second castrated boar is still alive and thriving, three weeks having elapsed since it was operated upon.

From *The Veterinarian*

April, 1832.

THE CLAIMS OF "THE VETERINARIAN"

By Mr. W. C. Spooner, *Blandford*

To the Editor of "The Veterinarian"

Gentlemen,

I, too, am one of those who for some time past have witnessed with regret that the *Veterinarian* increases but little in the number of its contributors; and I have naturally been led to inquire of myself the cause of this dereliction on the part of those best able to contribute the useful to its pages. I consider that the birth of the *Veterinarian* was an auspicious æra to our profession; for if that work becomes what it ought to be, *viz.*, a general receptacle for all improvements, it will anticipate years of labour and research, afford an easy and quick medium of communication, and a fountain which all might supply with some information and from which all might receive some knowledge. There is an excellent rule observed in planting trees, particularly in those by whose aid England has become the "pride of the sea": it is, for every single oak that is cut down, to plant two in its place. Now, as this rule has succeeded so admirably in planting, I am sure that I shall not be charged with presumption if I recommend the same rule for the observance of our profession: whenever a member receives information from a paper in the *Veterinarian*, let him consider it his duty to communicate two papers by way of payment. This plan, I am sure, would meet the satisfaction of the Editors; and if it were pursued, we should soon have no reason to complain of want of contributions; but the only difficulty would be in the selection of the most valuable papers, and those filled with venom would, of course, be excluded. Perhaps the ready reply of many experienced practitioners will be, "Our time is so much employed in practice, that we have none to dedicate to the pen," and perhaps they would add in their hearts, "We should not like to affix our names to any but superior papers." But, Gentlemen, I would reply, We will excuse any laboured production—a leaf from your case books will suffice—bestow ten minutes' time, and the end will be answered.

(*To be continued*)

Abstracts

[The Spasms of Electrically-stunned Animals in the Light of Biological Research. Muller, M. (Munich). *Deutsche Schlachthof-Zeitung.* 1932. No. 1.]

The author refers to this journal of March 10th, 1929, page 89, No. 4, where he defines electrically produced instantaneous stunning of animals as an epileptic condition. He points out that human beings who are suddenly overcome by this curious anomaly of life are completely unconscious and insensitive in spite of the appearance of tonic-cramp conditions, and after the fit has passed have no knowledge of what has happened in their bodies, even although in their case spasms have been observed which give the impression that the persons concerned are suffering pain.

The author quotes the experiments on animals carried out by Kussmaul and Tenner who stopped or compressed the arterial vessels leading to the brain causing unconsciousness and cramp, and when the arterial stream was reopened the cramp and unconsciousness disappeared, as in the case of animals for human consumption rendered spastic and unconscious by means of an electric current.

On the other hand, it was proved that consciousness was maintained as long as the brain was supplied with arterial blood. Kussmaul and Tenner also obtained, by electrifying the sympathicus of the neck on the side of the non-obstructed carotid, a general cramp condition and coma in animals. From their experiments on animals they concluded that epileptic symptoms in humans consisted in a functional disturbance of the central nervous system which must be caused by the effect on the vasomotor nerves or on their centres in the medulla oblongata, and they emphasised that the rapid arterial anæmia involves on the one hand the cerebral cortex as the organ of consciousness, while on the other hand the anæmia of the pons and medulla oblongata necessitates the appearance of spasms.

The author applies these discoveries of Kussmaul and Tenner to the process of electrical stunning of animals, concluding that "these experiments on animals are the foundation for the explanation of the electro-spastically produced unconsciousness in animals for slaughter, for since instantaneous electrical stunning cuts off or obstructs the blood stream from the brain in another way—without bleeding—the process is based on very long established physiological facts. The knowledge of them explains the principle and mechanics of electrical stunning."

The author quotes Nothnagel, who pointed out that the unconsciousness in an epileptic fit is caused by excitation of the vasomotor centres of the oblongata resulting from cramping or constriction of the brain vessels. The spasms immediately following he attributes to the excitation of a cramp centre in the pons.

The author therefore states that " it is false to conclude that, when on application of the electric current to the central nervous system a condition of cramp can be observed, consciousness is present. The electrical impulse affects the vasomotor centre, which normally keeps the arterial vessels in a certain condition of tension (tonus). The stronger impulse produced in electrical stunning necessitates, owing to the cramping of the vessels, a disturbance in the blood circulation in the cerebrum which results in loss of consciousness. On the other hand, the anæmia in the medulla oblongata causes tonic-clonic cramp to set in owing to the elimination of the reflex restraining influence exerted by the brain. Indeed, the extirpations of the brain first carried out by H. Munk and Luciani proved that the cramp which appears during unconsciousness is favourably affected by the elimination of that restraining influence of the brain."

The author refers to other experimental investigations carried out regarding coma and spasms being symptoms resulting from an interruption of the blood supply to the brain, and states " Reversely, when the supply of blood to the brain is interrupted by electrical excitation, coma sets in simultaneously with the spasms." There appears a lack of experimental proof throughout Professor Muller's paper to show that anæmia of the brain is produced by the electrical stimulation, although the symptoms shown are very similar to those found in animals where anæmia has been produced and with those occurring in an epileptic condition.

The author mentions the effect of the application of the electric current to the brain of turkeys which produces " unconsciousness and convulsions from anæmia of the brain with blanching of the comb." The vessels in the comb are peripheral vessels and not the cerebral vessels, and in view of our knowledge regarding the enormous increase in blood pressure produced after application of the electric current experimental proof should be forthcoming that constriction of the cerebral vessels takes place to account for the anæmia. Constriction of these vessels may nevertheless take place but evidence that the brain volume is decreased is necessary to prove that constriction of the cerebral vessels actually occurs.

In epilepsy the author states that the only unknown factor of importance is the impulse which releases the excitation of the vasomotor centre, with subsequent anæmia. He goes on to say further that " the presence of the condition of complete unconsciousness and insensitivity in animals which have been rendered

narcoleptic and electro-spastic owing to the application of the electric current to the brain has been further proved in a number of experiments in connection with the action of electrical currents on animals. I shall, however, reserve the discussion of these investigations and observations for a later study of the action of electric currents on the vital functions according to voltage, intensity and current. A. Weinberger will also report on this subject in an article on electro-technique which is to appear shortly in this Journal."

The author concludes his paper by "The results of the biological investigations just described, together with the reports on the conditions found in electrically-stunned animals can be summarised as follows:—

"(1) Every interruption of the blood supply to the brain in a manner which interferes with metabolism results in unconsciousness accompanied by tonic-clonic cramp symptoms.

"(2) In the electrical stunning of animals for slaughter the muscular cramp which sets in immediately the circuit is closed produces simultaneously unconsciousness and insensitivity owing to anæmia of the brain. When the animal is stuck in a comatose condition for bleeding purposes, corporeal death is brought about in a manner imperceptible to the animal without the return of consciousness."

W. T.

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[**American Methods of Milk Control.** *Lancet.* No. 5665. Vol. ccxxii. March 26th, 1932. pp. 695-696.]

The special correspondent contributor of this article commences by hinting that facts are on the side of those who maintain that America has taken our place in the van in the matter of milk control. Be that as it may, his account of New World methods is of particular interest in view of the recent decision of the Manchester City Council to seek powers to apply compulsory pasteurisation to the local milk supply. As the author points out, however, it by no means follows that methods that have been successful in the United States would be practicable in this country.

Health organisation propaganda is primarily responsible for the remarkable extent to which, in contrast to ourselves, the American citizen accepts milk as a beverage.

The public is instructed not only in the food value of milk, but also in the danger of milk-borne disease, thus creating an atmosphere favourable to milk control and especially to compulsory pasteurisation, which is now widely adopted in America. The remarkable degree of local legislative independence possessed by American cities has enabled the progressive communities to enact laws, and formulate administrative measures, which have set the pace in the movement for public health reform. The Federal Government, though possessing no administrative authority in the areas of the various States of the Union, yet exercises an effective influence and is, moreover, an intelligence centre for the collection and distribution of information on the technique of milk hygiene. It has been responsible for the production of the United States Public Health Service Milk Ordinance, which may be taken as indicating the provisions that are now in operation to safeguard the milk supply of the more progressive cities in America. The two main principles upon which the Ordinance is based are (1) that all producers and distributors of milk sold within a city (most of it comes from rural districts outside the administrative area) must hold a permit from the city health authority; (2) that all such milk must be graded and the container labelled with the label of the appropriate grade.

The Milk Ordinance provides for no fewer than eight grades of milk (though in practice a smaller number is generally adopted), which are briefly indicated thus:—

Certified milk must conform with the current requirements of the American Association of Medical Milk Commissions, and is produced under the supervision of the Medical Milk Commission of the County Medical Society, and of the State Board of Health, or of the City and County Health Officer. It is raw milk produced under stringent sanitary conditions, is sold at a high price, and forms but a very small proportion of the total milk supply.

Grade "A" raw milk must have an average bacterial count not exceeding 50,000 per c.cm. It must be drawn from cows that have passed a veterinary examination, with tuberculin testing, be cooled within one hour after milking to 50° F. or less, and kept at that temperature until delivery, and be supplied in bottles. It must also be produced under certain hygienic conditions, which are defined in detail.

Grade "B" raw milk must have an average bacterial count not exceeding 200,000 per c.cm.; otherwise it must conform with all the conditions that are required for grade "A" raw milk, except that the cooling temperature standard is 70° F.

Grade "C" raw milk may have an average bacterial count not exceeding 1,000,000 per c.cm.; otherwise it must conform with the standards that apply to grade "B" raw milk.

Grade "D" raw milk must, like all milk, contain not less than 3¼ per cent. of milk fat, and 8½ per cent. of solids not fat, but otherwise it is not standardised and must be labelled "cooking only."

Grade "A" pasteurised milk is grade "A" or grade "B" raw milk that has been pasteurised, cooled, and bottled in a milk plant complying with certain hygienic conditions. Its bacterial count must not at any time between pasteurisation and delivery exceed 50,000 per c.cm.

Grade "B" pasteurised milk is grade "C" raw milk pasteurised under all the conditions that apply to grade "A" pasteurised milk.

Grade "C" pasteurised milk is pasteurised milk that does not conform with the requirements of grade "B" pasteurised milk, and it must be labelled "cooking only."

The remainder of this informative communication treats mainly of the movement for compulsory pasteurisation, which is stated to have made great progress in America in recent years. Reference is made to an intriguing "guessing contest," suggested in an account of the "Public Health Service Milk Sanitation Programme," with the object of securing evidence (for newspaper publication) of the "fact" that proper pasteurisation does not affect the flavour of milk.

In America the lot of the dairyman who defaults as to maintenance of the prescribed standards of milk hygiene is deservedly hard. The Milk Ordinance provides two methods of dealing with him otherwise than by means of court prosecutions: one is the withdrawal of his permit, the other the degrading of the milk of the defaulter.

W. B.

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[New Veterinary Activities in Soviet Russia. Bederke. *D.T.W.*, No. 52, December 26th, 1931. 797.]

This article contains a brief description of the ABC of the Soviet "five years' plan," which aims in various ways at eliminating from workers all personal and selfish motives and to subjugate all talent to the national weal. In industry and agriculture special reliance is placed upon specialists doing the more particular and skilled work. The recognised importance of controlling animal diseases has brought veterinary science within the official range, and arrangements were made for broadcasting the results of new work, especially by means of the professional press. An innovation was introduced in the shape of competitions upon certain subjects relating to the prevention and control of animal diseases, and the discovery of new remedies. It was discovered, however, that competition among the institutes and laboratories tended to foster quantity as distinct from quality, and again the official brake was applied. A "special kollective" was established and institutes in 1931 offered a dozen scientific articles of quality as well as others suitable for local assimilation. All veterinary works must not only be of high scientific value but must conform to the Marx-Lenin methodology and Bolshevik tempo.

W. L. S.

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[The Treatment of Bitten Herbivora by Formolised Anti-rabies Vaccine. Plantereux, E. *Rev. Gén. de Méd. Vét.* (1931), No. 479, Vol. 40. 649.]

Formolised vaccine, now used with such success in dogs, has been tested on 79 herbivora (16 horses, 15 asses, 40 cattle, 2 goats and 6 pigs) which had been bitten by rabid animals. In only one case was vaccination unsuccessful in preventing the disease. In this case three young cattle had been badly bitten about the ears. Two of the animals were treated, treatment beginning one day after the bite. One died on the 13th day and the other on the 43rd day. The third untreated animal developed rabies on the 20th day. All the other animals remained healthy. These results were especially striking as in many cases treatment was begun rather late (10 and 15 days after infection) and several animals had been badly bitten. In vaccination after bites, four inoculations at weekly intervals are recommended. There is no advantage in decreasing the interval between inoculations. A sufficient degree of immunity is developed by the 22nd to 25th day. The period of incubation of rabies is generally more than 25 days. If treatment is begun within two or three days of the bite there is a good chance of success; if not begun within a week, only valuable animals are worth treating. Veterinarians are advised therefore, always to keep a small stock of formolised vaccine ready for emergencies.

C. McG.

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[Epizoötic Abortion of Ewes in Greece. Ananiades, B., and Miaoulis, N. *Rev. Gén. de Méd. Vét.*, 1931, Vol. 40, No. 480, p. 721.]

In other countries, epizoötic abortion has been found to be caused by infection with a bacillus related to *B. abortus* (Bang), a salmonella organism (*B. abortus ovis*) or a vibrio (*Vibrio fœtus*). The authors have studied the disease affecting ewes in Greece and have found that the cause was a brucella organism resembling *B. abortus* (Bang). The disease was first noticed in 1929. About 40 per cent. to 50 per cent. of the ewes may abort. Young ewes two to four years old are most commonly infected and the disease is most marked in flocks infested with *Distoma hepatica.* Abortion occurs in the third or fourth month of gestation. Profuse diarrhœa follows abortion and remains for about ten days. The appearance of the aborted fœtus and membranes is similar to that seen in contagious abortion of cattle. Many of the fœtuses are decomposed when expelled. Some ewes do not abort but the lambs live only for two to four days, dying of a *Brucella abortus* septicæmia and showing joint lesions from which the organism may be isolated. Some ewes develop purulent metritis. Lactation does not occur and about 10 per cent. of ewes become sterile. In the years succeeding the first appearance of the disease in a flock, the number of abortions decreases and finally abortions do not occur. Diagnosis is effected by (1) agglutination test; (2) culture of the organism.

The serum of normal ewes does not agglutinate *B. abortus* in a dilution higher than 1 in 50. The serum from infected ewes agglutinates

(*Continued at foot of page* 475.)

ROYAL COLLEGE OF VETERINARY SURGEONS

Supplemental Charter

We are pleased to report that at a Council held by His Majesty on April 9th, the King was pleased to approve the grant of a Supplemental Charter to the Royal College of Veterinary Surgeons. The main provisions of the new Charter are as follows:—

(1) To provide for an increase in the number of members of Council of the Royal College of Veterinary Surgeons from 32 to 36, four of whom shall be representatives of the members residing in the Irish Free State, to be elected by votes of such members.

(2) To authorise the Council of the College to fix by bye-laws the fees chargeable for admission to membership of the Royal College, including the fees for examination prior to admission, and similarly, to fix by bye-law the fee or fees for registration of names in the Register of Colonial and Foreign Practitioners.

(3) To authorise the Council to admit to the Fellowship of the Royal College not more than two members in any one year, such members to be of not less than 20 years' standing.

(4) To authorise the Council to institute post-graduate Diplomas in Tropical Veterinary Medicine, and in such other branches of Veterinary Science as may be from time to time found expedient.

B. abortus at dilutions of 1 in 100 to 1 in 1,000. Blood cultures of infected ewes remain sterile, but cultures from the fœtus (spleen, blood and stomach contents) yield growths of *B. abortus*. The organism isolated was inoculated into guinea-pigs and set up the typical lesions. The organism recovered from the guinea-pigs was still pathogenic to pregnant ewes. It was pathogenic to pregnant rabbits when fed to them, but not when inoculated per vaginam.

C. McG.

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[Heavy Losses among Animals due to Unsound Feeding Stuffs. Eggebrecht. *Tierärztl. Rdsch.* xxxvii., 551-552.]

A horse died after having been fed on wheat bran, which on examination was found to contain crushed castor beans; a flock of 40 chickens perished after eating a grain mixture which contained corn-cockle seeds. Other cases, which ended fatally, were due to ingestion of mouldy fodder or to feeding stuffs attacked by fungi or mites (crushed grain, oil-cakes, silos, etc.). The author points out that in all instances of spontaneous outbreaks of illness of obscure ætiological origin accompanied by digestive disturbances and simulating a contagious disease, feeding stuffs should be examined by an expert.

H. F.

N.V.M.A. Divisional Report

NORTH OF ENGLAND VETERINARY MEDICAL ASSOCIATION*

VISIT OF THE NATIONAL PRESIDENT

Annual Meeting at Newcastle-on-Tyne

On the occasion of the annual meeting of the North of England Division, N.V.M.A., held at the Armstrong College, Newcastle-on-Tyne, on Saturday, March 5th, the members were privileged to have a visit from the National President, Lieut.-Colonel P. J. Simpson, who delivered an address during the proceedings.

The day's programme opened with a demonstration of the induction of spinal anæsthesia in bovines, conducted by Mr. O. Stinson, at the Central Meat Market and at Messrs. Tindall's Abattoir, Newcastle. Later, at the annual meeting, Mr. Stinson said that the practice of spinal anæsthesia had proved an unqualified success and showed how invaluable it was in certain specified cases, where there was contraction of the uterus. This anæsthesia should be developed in the mare as in the cow, and he thought it would be just as valuable. Mr. Stinson counselled the members never to give the dose when there was any obstruction, or where there happened to be any monstrosity.

Following the annual luncheon in the University Union, the annual meeting was held in the Agricultural Department of the Armstrong College, when Mr. W. H. Blackburn, South Hetton, was in the chair. He was supported by the National President, Lieut.-Colonel P. J. Simpson; Dr. O. C. Bradley, Edinburgh; Dr. E. Tate, Newcastle; and the attendance book was signed by the following:—Messrs. W. J. Young, R. Barker, J. P. Isherwood, C. Elphick, T. M. Mitchell, H. Hicks, J. W. Rider, C. Nicholson, H. S. Elphick, T. Wilkinson, H. P. Lightfoot, W. A. Doughty, C. G. Hill, T. R. Jarvie, H. B. Allan, J. J. McDowall and J. R. Rider (Hon. Secretary). Dr. C. N. Armstrong and Messrs. O. Stinson, G. C. Scott, G. Oliver and T. Elphick were present as visitors. Apologies for absence were received from Messrs. J. H. Taylor, R. Simpson, P. Snaith (ill-health), G. Durrant, J. R. Pratt, J. D. Peele, E. H. Pratt, F. Pickering, F. Christopher, S. Sharp, L. E. Perkins, E. R. Callender, Professors F. T. G. Hobday and J. A. Hanley, Mr. R. J. Willan, Lieut.-Colonel J. A. Dixon and Mr. G. M. Mitchell.

COUNCIL REPORT

The Secretary then submitted the report of the Council Meeting, held at Durham on February 3rd, 1932, which was in the following terms:—

The Council received a letter from Mr. Croudace, intimating his resignation from the Division. The Secretary was instructed to ask Mr. Croudace to reconsider his decision.

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*Received for publication March 30th.

The Secretary reported that he had been in communication with Messrs. H. K. Lewis, and had ascertained that it would be possible for the Division to subscribe to the library, a course which would confer on members all the privileges of membership of the library, which would otherwise cost the individual at least £1 1s. per annum.

The Council carefully considered this matter, and decided to recommend that the Division should subscribe £3 3s. for the first year, which would entitle it to have from the library five volumes at any one time.

A letter was received from the N.V.M.A. enclosing a resolution from the Midland Counties Division to the effect that Johne's disease should be scheduled as a notifiable disease.

The Council decided to recommend that while compulsory notification of the disease was desirable, the time was not opportune for action to be taken in this direction.

In response to an invitation to appoint a delegate to the Brighton Congress of the Royal Sanitary Institute, it was decided to recommend that Mr. Jackson Young be asked to act as the Division's delegate.

The Secretary said that he had written Mr. Croudace asking him to reconsider his resignation, but had received no reply.

With regard to the library scheme, it was pointed out that if any books were desired, it was essential that application should be made through the Secretary.

The report of the Council was approved.

Annual Report and Financial Statement.—These were submitted, copies having been printed and circulated amongst the members.

The Chairman remarked that the Division was in a good financial position, and there was the sum of £40 on deposit.

The report and financial statement were approved.

N.V.M.A. PRESIDENT'S ADDRESS

The Chairman said they were privileged and honoured that day to have with them the National President, who would speak to them about the work of the National Association.

Lieut.-Colonel P. J. Simpson, in complying, said he had visited many Divisions during his term of office, representative of nearly every part of the countryside, and he would also visit Edinburgh to attend the Council Meeting there. He would like to congratulate the North of England Division on its numerical strength, and on the report which had been submitted to them. It had been said that that Division was proceeding on a tranquil course; however that might be, in his opinion the Division was a real live Association and was very active on many matters affecting the National. In their Secretary they had a real worker on the Council of the National.

As President, one would much rather address a meeting of those who were neither members of the National nor members of that Division, because these were the people they wanted to get at, more than those who were already members. He did hope, and he was sure this was the case, that every endeavour was being made by members of that Division to "rope in" as many members of the profession as they possibly could. They must try to present as united a front as possible to-day. That was one of the grievances of the National, that there were not sufficient members of the profession enrolled in it.

With regard to the work of the National, or should he say the benefits resulting to the member, these were—apparently—not very well understood by a great many people. Many members of the National seemed to think that the only object in joining was to obtain the *Record,* and did not appreciate the fact that their subscription to the National was a subscription to that body and that body alone. The *Veterinary Record* was posted to them more as a matter of grace than as a right inherent in membership.

Some people said: "What is the National doing?" and "What has it done for me?" That was entirely a selfish view to take. The aims and objects of the Association were to improve the general status of the profession. It did that, in addition to exercising effort on behalf of the individual: *e.g.,* a member who might think he had a grievance. Such matters were considered by the Council, and then passed on to the sub-committee responsible. If it was at all possible to right any wrong, then the Council would do so.

Then the National adopted the larger outlook, inasmuch as it was now being consulted by Government Offices, and by local and county councils, and so on; and a good deal of correspondence went on with regard to the employment of part-time or whole-time veterinary inspectors, and other matters, which ordinary members knew nothing about. It was only when one got into the position that he himself occupied at present that one began to realise the amount of work the National was doing.

It was quite impossible to mention all the activities of the National, because many things had to be tackled first in Committee before a decision was reached, and there were many matters to which he would like to refer, but they were still in the Committee stage. A new departure was the provision of a course of counter advertising, to warn the public against being misled by advertisements of unqualified persons and institutions employing unqualified persons. If any locality found that in a local paper there was being advertised the work of such individuals, or the opening up of a dispensary, then the National would issue the warning to which he had referred.

Colonel Simpson then made reference to the drawing up of a standardised certificate for the tuberculin test, which would be acceptable to all connected with the livestock trade and the Ministry of Health officials. Such a certificate, when approved, would be printed by the National in book form and it was hoped that in time they would be used by all veterinary surgeons conducting the tuberculin test.

There were certain articles of the Association which were in need of revision and a small Committee was now sitting dealing with this matter.

The scheme for the eradication of bovine tuberculosis was meeting with a certain amount of success. It had proved to be a very bad time to bring this matter forward, on account of financial stringency, because it might prove to be too expensive a business. The scheme had been turned down by a good many people on the score of expense. It had also been turned down by some people who one might say, owing to limitations of experience, did not believe in the reliability of the tuberculin test.

A brighter side was the keen interest evinced by the British Dairy Farmers' Association in the scheme, and a deputation from the National waited on them on March 1st. It seemed that the British Dairy Farmers' Association thought that it was a good scheme. Some thousands of copies of the scheme had been distributed amongst the cattle-breeding associations of Great Britain.

Colonel Simpson went on to refer to the good work done by the Editorial Committee in producing the *Record*, and said he wanted all to give them adequate support in their gratuitous work, by jotting down any little thing of interest, such as a case they had before them that day, and giving a description of it.

With regard to the free treatment scheme for necessitous owners of animals, the Colonel said that he was privileged to see the first centralised system working in Newcastle, and he must say that he was struck with the way in which the work was being carried out in that well organised clinic. It was a pleasure to see the poor people coming up with smiling faces appreciating the work that was being done to make better the health of their pets. Such work was deserving of all support and assistance.

Dealing with the forthcoming Congress at Folkestone, the President said he hoped that they would attend the event. The Congress would be divided into three sections: the pathological, the clinical, and public health sections. He himself was putting up a little trophy for a golf competition, the preliminary rounds of which were to be decided in each Division, the best of each Division to compete in the final rounds at Folkestone. The object of the competition was to collect a little more money for the Benevolent Fund. He had also started a Ladies' Guild in order to get the ladies interested in the Benevolent Fund. Already they had got 100 members and about £30 in cash, and he hoped that the ladies of each Division would support the Guild and develop the idea.

Colonel Simpson, in conclusion, said it had been a great pleasure for him to attend this meeting, and he wished the Division every prosperity and good luck in the future.

INDUCTION OF NEW PRESIDENT: ADDRESS FROM THE CHAIR

The Chairman then welcomed to the chair the new President, Mr. H. Hicks, of West Hartlepool, and wished him all success in his term of office.

In his presidential address, Mr. Hicks said:—

I deeply appreciate my election to the position of President of the N.E.V.M.A. After careful consideration I have come to the conclusion that I do not possess one single qualification for the office and that you have therefore performed a singularly kindly and graceful act in electing me. I have had serious misgivings as to my ability to maintain the position; at the same time, I am confronted by the fact that even if I wear the uniform of captain of the ship, I am accompanied on the bridge by a pilot of supreme efficiency in the person of our most excellent Secretary, who, I am sure, will somehow keep me on an undeviating course.

The infliction of an address is one of the few unassailable privileges of a President, since his victims, provided he keeps within the law, have no redress.

In the present instance, in view of the fact that we are all looking forward to something of real interest in the discussion on Dr. Tate's most excellent paper, my remarks will be brief.

The angle from which I view general practice is that of a single-handed practitioner of what is euphemistically termed middle age in a rather mixed practice in a distressed area, the test for middle age being that older members consider a man lacking in ripe experience, his juniors think he is out of date and his eldest son can wear his clothes and describe him as Victorian.

Under the circumstances the customary "horrorscope" detailing the past, present and future of the profession, may be dismissed in a few sentences. For the past year or so our position has been comparable to that of a man perched precariously on a crumbling wall with a horde of voracious devils on one side and the deep blue sea on the other. To an indifferent swimmer the situation has not been without its anxious moments. At the present time the best course to adopt is to emulate the gentle hippopotamus, who seems to get a certain amount of pleasure out of life so long as he can just keep both nostrils above water. For the future, in the Land of Hope and Glory we sing of, hope still remains; and no pendulum, in spite of Einstein, has so far succeeded in stopping at one end of its swing.

The general practitioner does not, as a rule, wear the purple and fine linen of his professional brethren of more regular hours and habits, and is called upon to bear the heat—or cold—and burden of the day seven days and, maybe, an odd night or two per week. He may or may not fare sumptuously every day but it is not improbable, in the absence of a really effective deodorising or abrasive cleansing agent, that he will be reminded of his calling, even at meal times.

He spends a large portion of his life in being a bit of a nuisance to some classes of the community since he devotes considerable time to bringing into the world a number of expostulating creatures which, if their language is understood, make a most reluctant entrance; to prolonging the existence of many animals whose sole ambition seems to be to end it; and to encompassing the hurried exit of others which evince no desire to depart this life.

At the same time he is in a position to enjoy many real compensations.

His relations to his fellow creatures may be roughly divided, as was Gaul, into three parts, namely, to his Patients, his Clients and his Profession.

With regard to his patients, their manners, with special reference to the Carnivora, appear to have depreciated to an alarming extent since the time of Androcles. Many of them show a fine disregard for the friendly warning of their medical advisor that he is not nearly so succulent as he looks. The grateful patient is indeed a rare bird.

In this connection one may speculate as to how much longer the horse will be our main anatomy subject. He is following Eohippus along the road which leads to natural history museums and his progress will be hastened by the adaptation of the Diesel engine to road transport, the manufacture of a light electrical storage battery and the commercial distillation of liquid fuel from coal. If we could reverse the factors of evolution or even divert them we might change his phalanges into those of his ancestral or contemporary Perissodactylates and so adapt him to present-day roads.

Clients, as a general rule, are so undemonstrative that real appreciation from one comes as a pleasant shock. Owners of the larger animals are apt to forget that the quadruped they offer for sale has ever been ill. If the patient dies, the good the veterinarian has accomplished previously is interred with the bones of the deceased.

With respect to the smaller animals the ignorance of the general public is lamentable. Owners of dogs and cats entrust the health and well-being of their pets to the care of persons whose qualifications are restricted to misplaced self-confidence, misdirected energies and misguided zeal, and whose little knowledge of the fundamentals of medicine and surgery is a menace to the unfortunate animals concerned. The sheer absurdity of the diagnosis and treatments of these self-constituted dog-leeches would be amusing were it not for the hardships unwittingly inflicted on the victims.

The average member of the public does not appear to comprehend that there is absolutely no substitute for the veterinary surgeon. Love of animals cannot replace methodically acquired knowledge of their ailments, enthusiasm cannot compensate for ignorance, devotion to an ideal cannot supplant the only system and course of training which, after nearly 90 years of gradual development, qualifies an individual to practise legally the Science and Art of Veterinary Medicine and Surgery. If he had any conception of the number of collateral subjects embraced in the present four years' course of study, of the meticulous care bestowed by each teacher on his special branch of the curriculum and of the high standard of efficiency in every subject in every examination which must be attained by a student before he can obtain his licence to practise, the layman's respect for, and faith in, the profession would increase immeasurably.

We practising members are all more or less confirmed altruists and it is therefore probable that veterinary surgeons in general will welcome the opportunity to collaborate with an approved and organised scheme for the treatment of animals of necessitous persons in our own districts as an alternative to the haphazard acts of charity we perform at present.

The subject of our relations with our profession and its allies is so deep that we can barely stir the top layers in passing. We general practitioners may, with becoming modesty, claim to be by far the most important members of the profession, since the latest scientific advances affecting it are bound to stand or fall by our verdict. Apart from the man who continually quotes his grandfather and, at the other extreme, the man who is always chasing a differently coloured butterfly, our opinions, inasmuch as our work is judged by results, are extremely sound. There has been an unfortunate tendency among some research workers towards an unseemly haste in jumping to conclusions. Their latest creation is admired through rose-tinted spectacles and is then displayed, complete with words and music, before a startled world. This inability to distinguish between *post hoc, propter hoc* or even —using dog latin, as befits a veterinary surgeon— *quamquam hoc,* gives the task of explaining how and why the product falls short of 24 carat all through, into our unwilling hands. The super-optimistic complex is shared by some makers of new therapeutical agents, which they christen with a high- or low-sounding name giving no indication of the composition or action, ingredients or incompatibles. Even if many of us do live in the country, that fact does not completely dull our wits or lessen our critical faculties. We can still see that the unquestioning acceptance of the claims made for these mysterious remedies is definitely empirical.

Recent advances in diagnostic and therapeutical principles come thick and fast and cover a vast field. The present tendency inclines towards organic products and these, provided they are specific and, above all, rapid, will receive our unstinted support. In some direction there is room for improvement. For instance, in the case of tuberculosis the biological test of milk

takes so long as to inflict hardship on the owner and is, after all, not infallible. Failing the elaboration of a definite biochemical reaction, a cultural method such as that of Frugoni offers distinct possibilities. In the realm of prophylaxis we have the diametrically opposed techniques of Calmette and Spahlinger, either or neither of which may eventually provide the answer we are seeking.

No matter what successes we achieve in the direction of the prevention and cure of disease, we may rest assured that our services will still be required. The force so aptly described by Sir Arthur Keith as "Nature's Pruning Hook" will continually offer us fresh problems to solve and unexpected difficulties to surmount.

This year will see the inception of our own five year plan. Of its necessity, in view of the ever-widening sphere of our activities, there can be no doubt. Its effect on the future entrant into general practice in terms of capital expenditure and yearly return is problematical. We may hope that a corner will be found somewhere for Veterinary Jurisprudence.

Finally, may I plead for your regular attendance at the meetings of the N.E.V.M.A.? Each one of us may both give and obtain benefit by so doing. To quote Bacon:—"Whosoever hath his mind fraught with many thoughts, his wits and understanding do clarify and break up, in the communicating and discoursing with one another. He tosseth his thoughts more easily, he marshalleth them more orderly, he seeth how they look when they are turned into words; finally he waxeth wiser than himself."

At the close of the address, which was appreciated for its racy literary character, Mr. Hicks called for a hearty vote of thanks to the retiring President.

ANÆSTHESIA AND NARCOSIS

Then followed a discussion on Dr. E. Tate's paper on "Anæsthesia and Narcosis," published in the *Veterinary Record* of January 30th, 1932.

On the call of the President, Mr. W. Jackson Young opened the discussion and said that the Division was deeply indebted to Dr. Tate for presenting them with what he described as a wonderful paper. It was a paper dear to his own heart, for he was always looking for informative matter and also for historical data; and Dr. Tate had given him his fill of that.

Mr. Young pointed out that although not now in general practice and not requiring to use anæsthetics, his interest in the subject still continued unabated, because of its historical aspect and also because of the interesting chemical composition of the substances used.

The history of anæsthetics went back as far as history really extended. He was looking into the history of medicine in Arabia and found there that opium had been called "the finger of God, it heals and it smites."

It was interesting to know that in the 16th century Paracelsus prepared a tincture of opium and called it laudanum, a synonym still used for tinct. opii (B.P. 1914). For nearly two centuries opium was very popular. In 1803, the alkaloid narcotine was isolated from it and in the following year, 1804, morphine was first described. Opium and full doses of alcohol were used as hypnotics until the introduction of chloral, by Leibreich, in 1869. Chloral, said Mr. Young, had stood the test of time, which was more than could be said for many preparations at present on the market. New remedies were often appearing, some of them lived for a time but many died in infancy; there was a high death rate amongst new remedies. From 1869, chloral was extensively used until paraldehyde came on the scene in 1882. It had a fairly long run. Another epoch-making year was 1903, when veronal was first used. A very large amount of research connected with veronal had been done. It now found a place in the B.P. 1914 under the name barbitonum; chemically it was diethylbarbituric acid. Organic chemistry was a fascinating subject for veterinary surgeons and recently he had worked out the chemical formulæ, with the aid of text books, on the various barbiturates and ureides and was most interested to see the manner in which the grouping of atoms took place.

With reference to anæsthetics and hypnotics, we required accurate information concerning the correct dosage, the relationship between the safe and lethal dose, the length of time taken for the substances to act and the duration of their action. Posology was not a simple subject in the lower animals. It required a knowledge of logarithms, parabola and sigmoid curves. Information on these matters was of the greatest importance to practitioners. There was a time taken up between the diffusion of the drug and its linkage to the cell receptors, and there was an interval after that before its action was established. There was a latent period that we ought to know something about. He was sure that Dr. Tate would appreciate that this was more easily ascertainable in the human subject than in the dumb animal.

Information concerning antidotes for the recent anæsthetics was also required. It was regretable that manufacturing chemists put these drugs on the market for use by medical, dental and veterinary practitioners without mentioning antidotes and their chemical composition. It was up to them, as qualified persons, to boycott such until their preparation was made known or accompanied by a formula they could understand.

Mr. Young also referred to avertin (tribromethylalcohol) and informed Dr. Tate that this anæsthetic was used for dogs and cats and care was taken to test it with congo red solution before administration.

Mr. H. S. Elphick also thanked Dr. Tate for his paper. He found that avertin was not suitable for dogs, although it was excellent for cats.

He had learned much from the paper and would like a few hints with regard to the treatment of the human subject in cases of collapse following use of anæsthetics.

Mr. T. M. Mitchell said he would like some information about the effect of chloral on the larger animals and whether it had a selective action on the motor nerve centres. He had a horse recently that showed motor paralysis after use of chloral.

Mr. C. Elphick added his quota of thanks to Dr. Tate for his paper. He would like Dr. Tate to tell them something about preparing the patient prior to the application of the anæsthetic. He knew that in nursing homes, prior to an operation, a patient had to undergo some tests to see whether he was a fit subject for the operation. He would also like to know the methods of administering anæsthetics in human practice. Veterinary surgeons might pick up a wrinkle or two from human practice.

What one wanted to know was the procedure to follow when a state of collapse arose. He asked Dr. Tate's opinion about the dual application of adrenalin and a general anæsthetic, about which he would like to know something definite, if possible.

Dr. Tate, before replying to the discussion, passed round for inspection a framed medallion of the late Sir James Young Simpson, one of the pioneers of chloroform anæsthesia, that had been presented to him that afternoon by Mr. Young.

Dr. Tate, replying, thanked the President, Secretary and members of the North of England Veterinary Medical Association for the kindly way in which they received his paper. He noticed that the *Veterinary Record* was founded in 1888 by William Hunting, F.R.C.V.S., but stated that he had just obtained a copy of the *Veterinary Record* dated April, 1847 (Vol. 3, No. 11), which contained an article "On the Effects of the Vapour of Æther on Animals" (the copy was shown to the members). He thanked Mr. Jackson Young for the bronze plaque of Sir James Young Simpson which he had given him. Agreeing with Mr. Jackson Young that the history of any medical subject was not only of interest, but formed an important starting point in the study of any subject, he detailed briefly the history of æther from the time of its discovery by the Arabian Alchemist Djafar Yeber early in the 11th century, to 1842, when it was first used as an anæsthetic by Crawford Long.

Replying to Mr. Jackson Young's question as to the length of time required for the barbiturates (referring particularly to nembutal) to act, and the duration of anæsthesia produced, he said that the time required for them to act depended upon the method of administration; if given by the mouth 30 to 45 minutes at least were required, but if given intravenously, narcosis was produced in from three to five minutes: recovery took place in from two to six hours followed by a protracted period of drowsiness which might last for 24 hours. Dr. Tate did not quite agree with Mr. H. Elphick regarding the use of avertin for dogs; he said it had been used very successfully in these animals, and quoted a paper by Adolph Bolliger in *The Medical Journal of Australia* (April 19th, 1930) in which it is stated that a dose of 0·48 gr. per kilo. body weight could be given with absolute safety to dogs. Replying to Mr. Mitchell, he said the case he quoted of motor paralysis in a horse following the use of chloral and chloroform, was very interesting, but he was not aware that chloral had a selective action on any particular motor centre; what might, in his opinion, easily happen would be a depression of the respiratory centre by using a combination of these two drugs.

Dr. Tate said that Mr. Clement Elphick had given him a big question to answer. Regarding the preparation of a patient for an anæsthetic, drastic purgation, copious enemata, and starvation were quite unnecessary, and even harmful; all that was necessary was a light, easily digested diet, and a series of mild aperients extended over a day or two; the patient's stomach should be empty at the time of operation, and the bowel should be sufficiently empty to prevent the possibility of an evacuation on the table, and to obviate the necessity of an aperient for 48 hours after operation. As regards the patient's ability to withstand an anæsthetic, his general condition should be taken into account—the condition of his heart muscle was important. A good test was by the use of Moot's Rule, which was worked out as follows:—"The systolic and diastolic blood pressures are estimated; subtract diastolic from systolic pressure—this gives us the pulse pressure; then the pulse pressure divided by the diastolic pressure, and multiplied by 100, gives us the Index of Operability. If between 25 and 75 (per cent.) the case is probably operable.

Example:—

Systolic blood pressure	...	175
Diastolic blood pressure	...	65
Pulse pressure	...	110

$$\frac{100}{65} \times 100 = 22\%$$

The chief points to be guarded against during the administration of an anæsthetic were the avoidance of an overdose of anæsthetic, and of any obstruction, however small, to the respiration: the great majority of troubles arising during anæsthesia were respiratory in origin. There were many methods of administering anæsthetics apart from the open method; special apparatus was required for the administration of nitrous oxide and oxygen, also for intra-tracheal anæsthesia; anæsthetics could also be given orally, *per rectum*, or by the blood stream as mentioned in his paper.

They were singularly lacking in antidotes to anæsthetics; as most of the general anæsthetics

were eliminated by the respiratory system, what they could do was to increase the rate of elimination by the use of respiratory stimulants such as carbon dioxide or lobelin. Anæsthetic emergencies might arise with startling suddenness: fortunately for them it was in the majority of cases the respiratory system which failed first; if recognised in time, artificial respiration would restore the patient, but if the heart and respirations failed simultaneously or the heart first, the outlook was very grave, and direct cardiac massage, if done early, together with artificial respiration, was the best they could do, but the chances of recovery were not great. Levy had shown that the introduction into the circulation of adrenalin during incomplete chloroform anæsthesia was very liable to induce fatal cardiac fibrillation; the adrenalin must precede, not follow, the anæsthetic.

Vote of Thanks.—On the call of the President, Dr. Tate was thanked again for his excellent paper and for his information in replying to the discussion.

County Show.—Mr. H. Elphick submitted a statement about his being asked to take the convenership of a Committee connected with the raising of a fund for the forthcoming County Show at Newcastle in July, and hoped that if he accepted the post, he would have their support.

Alleged Poisoning of Pastures.—Mr. Clement Elphick raised the question of alleged poisoning of pastures, referred to by Dr. Dunn in a recent lecture which had appeared in the *Newcastle Journal*. He suggested that Dr. Dunn might be asked to deliver the same lecture to members of the Veterinary Association, and that the Council should take up the matter. Mr. Elphick added that Professor Louis, of Armstrong College, held views other than those advocated by Dr. Dunn.

LADIES' EFFORT FOR THE VICTORIA VETERINARY BENEVOLENT FUND

During the afternoon the ladies held their annual effort on behalf of the Victoria Veterinary Benevolent Fund. A company numbering 80 ladies assembled in the University Union, where keenly contested bridge and whist tournaments took place. The proceeds amounted to £20 12s. 6d., and the Ladies' Committee, with Mrs. Blackburn as Chairman and Mrs. J. W. Rider as Secretary, is to be congratulated on the success of its efforts.

Members joined the ladies at tea, to witness the presentation of prizes to the successful players, amongst whom was Mrs. P. J. Simpson.

Colonel Simpson expressed the thanks of the Council of the Victoria Veterinary Benevolent Fund for the continued generous support from the North of England, and after telling the company of some of the pitiful appeals for help, said that his experience that day in Newcastle had provided him with ample material for future appeals on behalf of the fund.

He thanked one and all for their generous help and assured them that it would afford most welcome assistance for their less fortunate sisters.

The President thanked Colonel Simpson for his address, which he said would encourage the North of England to maintain in the future the function which appeared to be firmly established to-day.

J. R. Rider, *Hon. Secretary.*

Notes and News

DIARY OF EVENTS

April 25th.—N.V.M.A. Editorial Committee, 2, Verulam Buildings, W.C.1, 4.30 p.m.

April 27th.—Meeting of the Section of Comparative Medicine of the Royal Society of Medicine.

April 27th.—Annual Meeting of the West of Scotland Division, N.V.M.A., at Glasgow.

April 29th.—Meeting of the Yorkshire Division, N.V.M.A., at Leeds.

April 29th.—Ordinary General Meeting of the Royal Counties Division, N.V.M.A., at Guildford.

May 5th.—R.C.V.S. Last day for Nominations for election to Council.

May 10th.—Meeting of the Derbyshire Division, N.V.M.A., at Tamworth.

May 12th.—D.V.S.M. Examination entries due.

May 19th.—R.C.V.S. Council Election Voting Papers issued.

May 26th.—R.C.V.S. Last day for receipt of Voting Papers.

June 2nd.—R.C.V.S. Annual General Meeting. V.V.B. Fund Annual General Meeting.

June 9th.—D.V.S.M. Written Examination begins.

June 13th.—D.V.S.M. Oral Examination begins.

June 29th.—R.C.V.S. Committee Meetings begin.

June 30th.—R.C.V.S. Annual Dinner.

July 1st.—R.C.V.S. Council Meetings.

July 6th.—R.C.V.S. Summer Examinations begin.

Aug. 8th-13th.—N.V.M.A. Jubilee Congress at Folkestone.

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THE EDINBURGH VENTURE

In view of their disheartening experience on the occasion of last year's attempt to hold a meeting of Council, N.V.M.A., in the provinces, the President and the London party travelled to the Edinburgh meeting with some trepidation. The event proved that there was no occasion for such qualms: the association spirit is strong

in Scotland, and the attendance at the "Dick" College on Tuesday of last week justified the faith of those who pressed for the abandonment of half-measures and a bold invasion across the Border. Scotland has earned further consideration in this regard.

. . . . .

A full account of the proceedings at this meeting of Council will appear next week, but we feel that our echo of the President's thanks to Dr. Bradley and all associated with him in making the Council welcome in a multitude of gracious and practical ways should not be allowed to wait upon reporting processes.

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R.C.V.S. COUNCIL ELECTION

The last day for nominations for election to the Council of the Royal College of Veterinary Surgeons is Thursday, May 5th. Up to date, 10 nominations have been received for the eight normal vacancies. As Professor Craig is a candidate for election as a representative of the Irish Free State, if he is elected in that capacity an additional vacancy will be created.

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OBITUARY

Benson, Mary Grace, wife of Captain B. H. Benson, M.R.C.V.S., 97, Goldhurst Terrace, N.W.6, on April 18th, after an operation.

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FOOT-AND-MOUTH DISEASE IN KENT

The existence of foot-and-mouth disease was confirmed on Monday last at premises near Cheriton, in the neighbourhood of Folkestone, and the customary restriction of movement of animals order is in force.

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ARMY VETERINARY SERVICE

London Gazette—War Office—Territorial Army Reserve of Officers

April 19th.—Captain A. Fowler, having attained the age limit, relinquishes his commission. (April 20th.)

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SHIRE HORSE SOCIETY

At a recent Council Meeting of the Shire Horse Society held at 12, Hanover Square, Mr. N. W. Smith Carington, M.P., formally installed Mr. Thomas Forshaw as President of the Society for the year, and Sir Edward D. Stern, Bart., as President-elect, *i.e.*, President in 1933. The Chairman disclosed in no vague terms his appreciation of all the Forshaw family had done for Shire Horse breeding during the last half century, and the acclamation with which his words were received indicated that the choice of the present head of the Forshaw family as President of the Shire Horse Society was one which was certain to be popular wherever Shire horses are bred.

The report of the Finance Committee was presented by Mr. A. Thomas Loyd, and indicated that the cost of the last London show was £1,865 as compared with £1,930 in 1931 and £2,485 in 1930.

Mr. A. H. Clark presented the report of the Editing Committee, in which it was stated that some 3,000 copies of Volume 53 of the Stud Book had been issued to members whose subscriptions had been received, the cost having been met by receipts in registration fees.

Mr. A. Thomas Loyd presented the report of the Horse Show Committee. Of the 134 animals subjected to compulsory veterinary examination, only three failed to obtain a clean bill of health from the three veterinary surgeons whose duty it is to examine all exhibits (except yearlings) before they enter the judging ring. Similar satisfactory reports were received from the various stewards who are responsible for the organisation and, bearing in mind the reduced cost of the show, the Committee expressed their appreciation of the services of all those who had helped to make the show such a success.

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Existing legislation does not provide for the possibility of a number of cows being missed by routine inspection, for cattle may cease to be useful for milk production and may be sold, new stock being bought just after a visit by the veterinary surgeon. Milk from the new stock may then be sold to the public without the new stock having been inspected. It has been suggested therefore that there should be an amendment to the Milk and Dairies (Consolidation) Act, 1915, the Milk and Dairies Order, 1926, and the Tuberculosis Order, 1925, making it compulsory for a milk producer to notify the medical officer of health within 24 hours of any purchase of stock. Milk from such animals would then not be sold to the public until after inspection of the cattle by a veterinary surgeon.—*Jour. Inst. Hyg.*

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Writing in the *Bruxelles Medical*, Dr. M. Stassen condemns the use of the tourniquet as a means of stopping hæmorrhage, and during the past seven years he has dispensed with it in the first-aid equipments of his hospital. He regards the tourniquet as a frequent source of trouble—it arrests completely the circulation of blood in the limb to which it is applied, and so promotes infection in the crushed and torn tissues, and its removal may be followed by the absorption of toxic products capable of killing a patient already weakened by cold, shock, and loss of blood. If a tourniquet is used to stop the flow of blood from a wound it should, of course, be removed at the very earliest possible moment.

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Mechanical traction, we are led to believe, is on the decrease in Canada, and that the horse is coming back into favour. Encouraging outlook for Clydesdale breeders, as Canada pays the highest prices for good, weighty horses of this breed.—*Agricultural Paper.*

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"Mr. E. Brayley Reynolds, who won the Elvaston Castle Selling Plate with Romtoi, is the veterinary surgeon to the Jockey Club. He paid a professional visit to Ireland last year, and before going he told Jack Colling that if he saw a likely looking yearling going cheaply at the Dublin sales he would buy it for Colling to train," writes Captain Rickman in the *Daily Mail* of April 16th.

"He gave 50 guineas for Romtoi, who is by Romney out of Amatoi. Romney was a Gainsborough horse who promised well at Manton but did not stand training."